USSR

A. VASIL'YEV, Director of the Siberian State Sci-Res Institue of Metrology, Novosibirsk

"Metrologists Offer Their Services" (Letters to the Editor)

Moscow, Sotsialisticheskaya industriya, 20 Apr 73, p 2

Abstract: At the Academy of Sciences Ukrainian SSR and at the Main Geophysical Laboratory in Leningrad metering systems have been set up with 50 automatic measuring stations which reveal the concentration of polluting gases, the effectiveness of air-filtering equipment, and predict the particulate content and pollution of the air in relation to the natural atmosphere. Plans call for setting up these stations in several cities in the European part of the USSR, and in Kemerovo in 1973-74.

The author calls the preservation of nature the most important social problem of the century and proposes that metrological services share the antipollution task with the medical services, and that a system of measurement stations, similar to seismic stations, be set up throughout the USSR to monitor air pollution.

1/1

USSR

VASIL'YEV, A. A., KOMPANETS, I. N., NIKITIN, V. V.

UDC: 621.375.826+532.783

"Shortening the Switching Time of an Optical Transparency on a Liquid Crystal"

Moscow, Kvant. elektronika (Quantum Electronics), No 3, "Sov. radio", 1972, pp 81-83 (from RZh-Avtomatika, Telemekhanika i Vychislitel'naya Tekhnika, No 1, Jan 73, abstract No 1B438 by T. V.)

Translation: A transparency on a liquid crystal controlled by an electric field is used for data recording. Scattering of the light flux with turbulent motion of the domains of the liquid crystal by sections of the transparency to which the electric field is applied leads to loss of coherence of the transmitted light and a sharp attenuation of its intensity. The pattern of electric voltages recorded on the transparency is thus transformed to an optical image which is transferred as a hologram to a photographic plate, using a laser. The frequency characteristics of dynamic scattering are studied for activation and deactivation. As a result of studying the influence which an alternating electric field and short field pulses have on scattering duration, an image recording cycle time of less than 1.2 ms is achieved. Three illustrations, bibliography of six titles.

1/1

USSR

UDC 620.17

AGARONIK, V. Ya., VASIL'YEV, A. A., DAYCHIK, M. L.

"Study of Characteristics of High Temperature Tensoresistors"

Issled. Temperatur. Napryazheniy [Studies of Temperature Stresses -- Collection of Works], Moscow, Nauka Press, 1972, pp 103-132, (Translated from Referativnyy Zhurnal, Mekhanika, No 11, 1972, Abstract No 11 V1347 by the author's).

Translation: Methods and results are presented from studies of temperature and time characteristics of constantan, nichrome, Kh20N80Yu and Kh20N80YuD chrome-nickel alloy, NM23KhYu nickel-molybdenum alloy and OKh21Yu5FM, OKh21Yu9 and OKh21Yu10 iron-chrome-aluminum alloy wires up to 30 μ in diameter, used in high temperature tensoresistors. The studies are performed at temperatures up to 650°. The basic dependences of the resistivity increment of the wires under isothermal holding are established and critical temperatures are determined for each alloy, above which stabilization of the specific resistance and temperature factor of resistance of the tensoresistors is impossible. The possibility is demonstrated of creating thermal self-compensation of tensoresistors in the interval up to 350° using chrome-nickel alloys Kh20N80Yu and Kh20N80YuD. The temperature and time charac-

1/2

USSR

UDC 620.17

AGARONIK, V. Ya., VASIL'YEV, A. A., DAYCHIK, M. L., Issled. Temperatur. Napryazheniy, Moscow, Nauka Press, 1972, pp 103-132.

teristics of tensoresistors of nickel-molybdenum alloy in the temperature range up to 500° are presented. 13 Biblio. Refs.

2/2

USSR

UDC 532.593+662.215.1

VASIL'YEV, A. A., GAVRILENKO, T. P., MITROFANOV, V. V., SUBBOTIN, V. A., and TOPCHIYAN, M. Ye.

"The Position of the Point of Transition Through Sonic Velocity Behind a Detonation Front"

Novosibirsk, Fizika Goreniya i Vzryva, No 1, 1972, pp 98-104

Abstract: An attempt is made to determine experimentally the position of the Chapman-Jouguet surface behind the front of a detonation occurring in a pipe. In pipes filled with various gas mixtures, the interaction of a detonation wave with a thin plate, situated along the pipe axis, is studied at various pressures to determine the position of the Chapman-Jouguet point. 2 figures. 1 table. 9 references.

1/1

Single Crystals

USSR

UDC 539.67

VASIL'YEV, A. A., and GRUZIN, P. L.

"Interaction Between Point Defects and Dislocations in Molybdenum Single Crystals"

Sb. "Vnutrenneye treniye v metallicheskikh materialakh" (Internal Friction in Metallic Materials), Moscow, Izd-vo "Nauka," 1970, pp 90-94

Abstract: The results of an investigation of the recovery of amplitude-independent and amplitude-dependent internal friction on deformed, annealed molybdenum samples are presented. Two recovery phases were observed. The first recovery phase is related to the migration of dislocated impurities atoms; the second phase is divided into two stages. A redistribution of impurity atoms takes place in the first stage, with subsequent locking on dislocations; however, the locking of dislocations is weak, and with increasing vibration amplitude the dislocations break away from locking points. The formation of Cotterell atmospheres occurs in the second stage. Radiation by electrons affects only the first recovery phase. 3 figures, 4 references.

1/1

USSR

VASIL'YEV, A. A., GAVRILENKO, T. P., TOPCHIYAN, M. YE.

UDC 534.222.2

"Location of the Chapman-Jouguet Surface in Multifront Detonation in Gases"

V sb. 3-y Vses. simpozium po goreniyu i vzryvu, 1971 (Third All-Union Symposium on Combustion and Explosion, 1971--collection of works), Chernogolovka, 1971, pp 199-200 (from RZh-Mekhanika, No 11, Nov 71, Abstract No 11B135)

Translation: In the example of gaseous explosive mixtures, a study was made of the transition of the steady-state detonation wave from a metal tube to a tube of the same diameter made of cellophane film. At low initial pressures of the gas mixture after the transfer of detonation to the cellophane tube, a detonation rate drop was observed, sometimes reaching extinguishing of the detonation. With an increase in pressure, beginning with some value, the detonation rate became identical in both tubes. It is proved that in the first case the detonation rate drop is connected with the occurrence of an expansion wave occurring as a result of expansion of the cellophane tube into the zone in which the gas velocity relative to the front is less than the speed of sound, that is, into the zone between the leading edge of the detonation and the Chapman-Jouguet surface. The position of the Chapman-Jouguet surface with respect to the distance between the leading edge of the wave and the place where noticeable expansion of the tube begins as a result of spreading of the walls was estimated

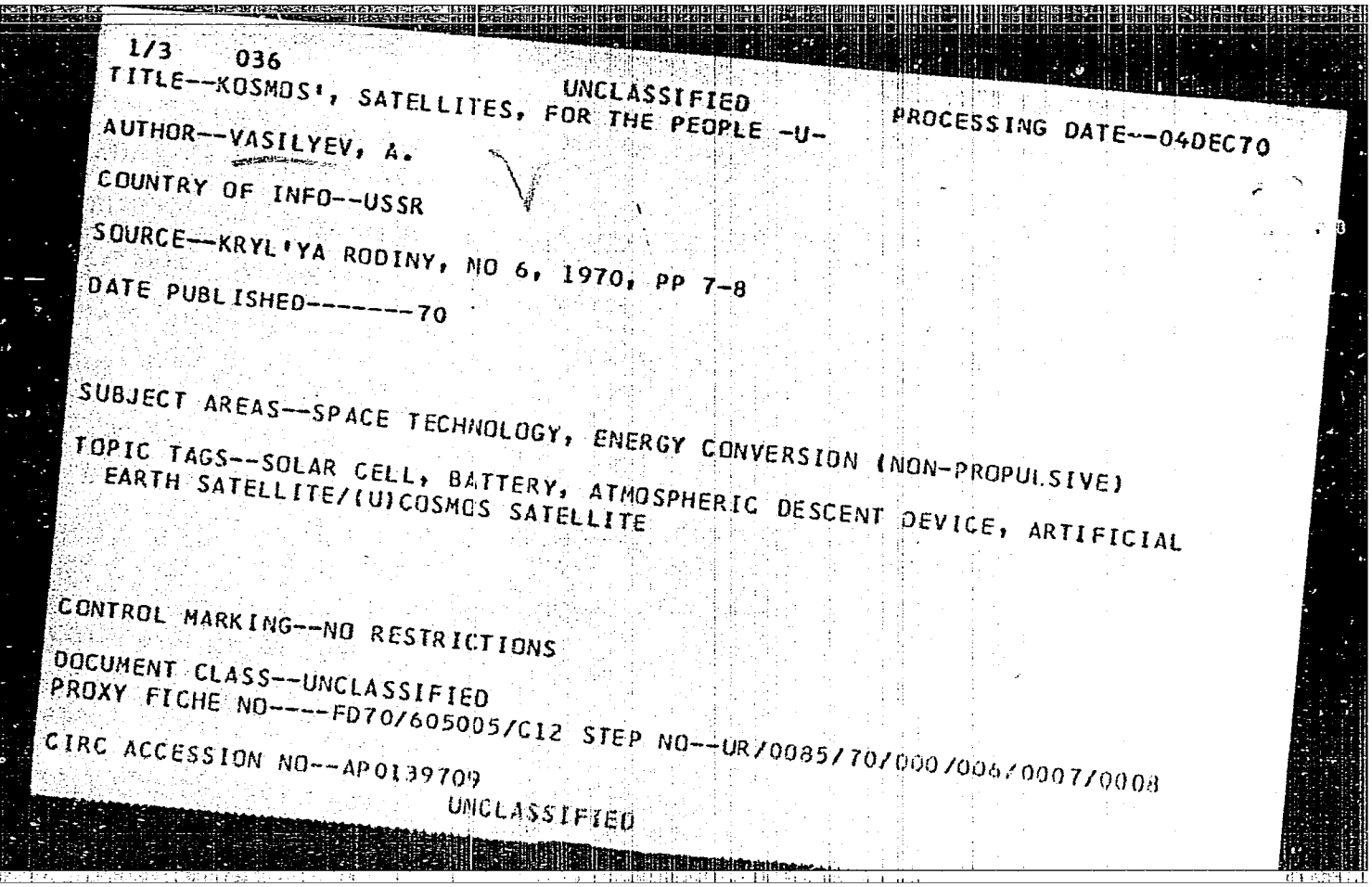
1/2

USSR

VASIL'YEV, A. A., et al., 3-y Vses. simpozium po goreniyu i vzryvu, 1971, Chernogolovka, 1971, pp 199-200

by means of instantaneous photographs of the critical detonation in the cellophane tube . By using the analytical form of the expansion trajectory of the cellophane tube, a one-dimensional numerical calculation of the profiles of the mean gas parameters behind the detonation wave was performed as a result of which it was discovered that these parameters differ essentially from those obtained by the one-dimensional Zel'dovich-Neuman theory.

2/2



1/3 036 UNCLASSIFIED

TITLE--KOSMOS', SATELLITES, FOR THE PEOPLE -U- PROCESSING DATE--04DEC70

AUTHOR--VASILYEV, A.

COUNTRY OF INFO--USSR

SOURCE--KRYL'YA RODINY, NO 6, 1970, PP 7-8

DATE PUBLISHED-------70

SUBJECT AREAS--SPACE TECHNOLOGY, ENERGY CONVERSION (NON-PROPULSIVE)

TOPIC TAGS--SOLAR CELL, BATTERY, ATMOSPHERIC DESCENT DEVICE, ARTIFICIAL EARTH SATELLITE/(U)COSMOS SATELLITE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY FICHE NO----FD70/605005/C12 STEP NO--UR/0085/70/000/006/0007/0008

CIRC ACCESSION NO--AP0139709

UNCLASSIFIED

2/3 036 UNCLASSIFIED

CIRC ACCESSION NO--AP0139709 PROCESSING DATE--04DEC70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE STANDARDIZED RESEARCH SATELLITE CREATED IN THE USSR (INCLUDING ITS SEVERAL MODIFICATION) IS CHARACTERIZED BY INTERCHANGEABILITY OF ITS BASIC SYSTEMS AND PARTS. THE "KOSMOS" SATELLITES ALL HAVE THE SAME BODIES, ANTENNAS, SOME ON BOARD CONTROL SYSTEMS, ELEMENTS AND COMPONENTS OF THE ELECTRICAL SYSTEM. FOR BETTER PLACEMENT OF APPARATUS AND INSTRUMENTATION THE "KOSMOS" BODY IS DIVIDED INTO SEVERAL COMPARTMENTS. PROVISION IS ALSO MADE FOR PLACEMENT OF SOME SERVICING AND SCIENTIFIC COMPONENTS ON THE OUTER SURFACE. DEPENDING ON THE MISSIONS ASSIGNED ON A FLIGHT, PARTICULARLY FLIGHT DURATION, THE ELECTRICITY SOURCE IS CHEMICAL BATTERIES, SOLAR CELLS, OR BOTH SIMULTANEOUSLY. IF IT IS NECESSARY FOR THE SATELLITE TO HAVE PROTRUDING PARTS, AS WHEN STUDYING SOME PROPERTIES OF THE IONOSPHERE, THE SOURCE OF ELECTRIC POWER IS EXCLUSIVELY CHEMICAL BATTERIES. IN CONDUCTING SCIENTIFIC RESEARHC REQUIRING RETURN OF THE APPARATUS AND EXPERIMENTAL MATERIAL TO EARTH THE ENGINEER$ HAVE CREATED A "KOSMSO" VARIANT WITH A DESCENT MODULE. NATURALLY, THIS REQUIRED THE INTRODUCTION OF A BRAKING ENGINE AND PARACHUTE SYSTEM. THE SCIENTIFIC INSTRUMENTATION ON THE "KOSMSO" SATELLITES VARIES IN DEPENDENCE ON THE MISSION. THE MAKEUP AND TYPE OF SERVICE SYSTEMS, HOWEVER, REMAINS VIRTUALLY CONSTANT. IF ANY CHANGES ARE MADE THEY ARE INSIGNIFICANT. THE SERVICE SYSTEMS ARE USUALLY IN PREFABRICATED ASSEMBLIES. THIS MAKES POSSIBLE EFFICIENT USE OF THE INTERNAL VOLUME OF THE SATELLITE AND SIMPLIFIES ASSEMBLY AND ADJUSTMENT WORK. EVERY STANDARDIZED "KOSMOS" SATELLITE HAS SEVERAL SERVICE SYSTEMS.

UNCLASSIFIED

3/3 036 UNCLASSIFIED

CIRC ACCESSION NO--AP0139709 PROCESSING DATE--04DEC70

ABSTRACT/EXTRACT--ONE, THE HEAT REGULATING SYSTEM, MAINTAINS THE NECESSARY HEAT REGIME DESPITE VERY STRONG EXTERNAL AND INTERNAL HEAT SOURCES. THE EXTERNAL SOURCES INCLUDE EXPOSURE TO THE SUN'S RAYS AND RADIATION REFLECTED BY THE EARTH. INTERNAL HEAT IS CREATED BY OPERATING INSTRUMENTS AND ASSEMBLIES. HEATING OF THE "KOSMOS" SATELLITES IS VERY NONUNIFORM AND IS DEPENDENT ON MANY FACTORS. WITHOUT HEAT REGULATION SOME INSTRUMENTS WOULD BURN UP AND OTHER WOULD FREEZE. THE RADIO TELEMETRIC SYSTEM IS VIRTUALLY ALWAYS OPEN. THE SERVICE SYSTEM INCLUDES INSTRUMENTATION FOR CHECKING ON THE ORBITAL PARAMETERS AND A SPECIAL COMMAND RADIO LINK. THE TYPE OF ORIENTATION SYSTEM USED IS DEPENDENT ON WHETHER A PARTICULAR AXIS MUST BE ORIENTED ON THE SUN OR THE EARTH. A COMBINED SYSTEM IS SOMETIMES USED. THE WORKING ORGANS ARE GAS JET MICROENGINES AND FLYWHEELS ROTATING WITHIN THE SATELLITE FOR ROTATING THE SATELLITE ABOUT ITS CENTER OF MASS. IN OTHER CASES THESE SATELLITES HAVE AN AERODYNAMIC STABILIZATION SYSTEM IN COMBINATION WITH A SPECIAL DAMPING SYSTEM.

UNCLASSIFIED

Acc. Nr.: AM0044575 V Ref. Code: UR0000

Vasil'yev, A. A.

Training of Personnel in Machine Construction (Podgotovka kadrov v mashinostroyenii) Moscow, Mashinostroyeniye, 1970, 236 pp (SL:19[illegible]4)

TABLE OF CONTENTS:

1/2

Reel/Frame [illegible] 18

AM0044575

The book deals with the system for training and improvement of skills of workers and engineering-technical personnel in connection with scientific organization of labor in machine construction...

The book was written for employees of machine-constructing enterprises working on problems of training and improvement of skill of personnel...

2/2

88

19771244

USSR

UDC 539.3:551.243

VASIL'YEV, A. A., and GRUZIN, P. L.

"Interaction of Point Defects With Dislocations in Molybdenum Mono-Crystals"

V sb. Vnutr. treniye v metallich. materialakh (Internal Frictions in Metallic Materials -- collection of works), Moscow, Nauka Pub. House, 1970, pp 90-94 (from RZh-Mekhanika, No 12, Dec 70, Abstract No 12V507, Author's Abstract)

Translation: Results are presented from a study of the recovery of amplitude-independent and amplitude-dependent internal friction in the following classes of monocrystalline molybdenum specimens: deformed, annealed at different temperatures, and bombarded with electrons. Two recovery stages were found. The first recovery stage is associated with the migration of dislocational impurity atoms; the second stage is divided into two further substages. Redistribution of the interstitial atoms occurs in the first stage, followed by their immobilization at dislocations; however, dislocational immobilization is weak and when there is a rise in the amplitude of vibrations, dislocations part from their immobilization sites. The formation of Cottrell atmospheres occurs in the second stage. Electron bombardment affects only the first recovery stage. Bibliography: 4 entries.

1/1

USSR UDC:

VASIL'YEV, A. A., GRUZIN, P. L.

"Interaction of Point Defects With Dislocations in Molybdenum Monocrystals"

Vnutr. Treniye v Metallich. Materialakh [Internal Friction in Metallic Materials -- Collection of Works], Moscow, Nauka Press, 1970, pp. 90-94 (Translated from Referativnyy Zhurnal Fizika, No. 11, 1970, Abstract No. 11 Ye 1364 by the Authors)

Abstract: Results are presented from the study of the recovery of amplitude-dependent and amplitude-independent internal friction in deformations annealed at various temperatures and bombarded by electrons in monocrystalline Mo specimens. Two stages of recovery are detected. The first stage of recovery is related to migration of dislocated impurity atoms; the second stage is divided into two parts. During the first part, redistribution of interstitial atoms occurs with subsequent attachment of

USSR

UDC:

VASIL'YEV, A. A., GRUZIN, P. L., Vnutr. Treniye v Metallich. Materialakh [Internal Friction in Metallic Materials -- Collection of Works], Moscow, Nauka Press, 1970, pp. 90-94 (Translated from Referativnyy Zhurnal Fizika, No. 11, 1970, Abstract No. 11 Ye 1364 by the Authors)

these atoms to dislocations; however, the attachment of dislocations is weak, and as the oscillation amplitude increases, dislocations separate from their attachment points. During the second stage, Cottrell atmospheres are formed. Electron bombardment influences only the first stage of recovery.

2/2

UDC 616.1:359.6

VASIL'YEV, A. B., First Lieutenant, Medical Corps, KOL'TSOV, A. I., Major, Medical Corps, and TAMANOV, N. I., Candidate of Medical Sciences, Lieutenant Colonel, Medical Corps

"The Functional State of the Cardiovascular System in Naval Aviation Crews During Summer"

Moscow, Voyenno-Meditsinskiy Zhurnal, No 4, 1973, pp 68-69

Abstract: The state of the cardiovascular system was evaluated in the case of 26 Naval pilots and navigators during and after a prolonged cruise. The studies showed that changes in the cardiovascular system were to a large extent dependent on the duration of the cruise. At the end of the cruise the average decrease in pulse rate was 4/min ($P < 0.05$); in comparison with the resting pulse rate, at the beginning of the cruise static muscular effort elicited a 30-40% increase in the pulse rate, in the middle of the cruise the average increase was 58%, and at the end of the cruise the mean increase was 68%. Arterial blood pressure decreased by 11% in the middle of the cruise for the entire crew, but in 8 individuals the decrease ranged from 15-20%. EKG studies conducted at the beginning of the cruise showed no changes. In the middle of the cruise the

USSR

VASIL'YEV, A. B., et al., Voyenno-Meditsinskiy Zhurnal, No 4, 1973, pp 68-69

electric systole was found to be prolonged, the amplitude of the P wave decreased by 34%, and changes in the R and T waves indicated decreased tonus of the sympathetic innervation and increased tonus of the parasympathetic innervation. In 7 subjects the T wave was flattened on physical exertion (1.5 to 2-fold), and in 3 individuals physical exertion caused the QRS complex to be prolonged. The EKG changes were more pronounced at the end of the cruise. It was also observed that after a 2 hr flight blood pressure and pulse rate were within the norm for most pilots and navigators. After two 1.5-2 hr flights at intervals of 15-20 min the systolic and diastolic pressure was increased by more than 10 mm Hg in the majority of the subjects, and the pulse rate increased by 10-15 beats/min. The reactions in the navigators were less pronounced than in the pilots, as a rule. After a 3 hr flight at the beginning of the cruise there was an increase in the systolic and the diastolic pressures, without a change in the pulse pressure. A similar flight in the middle of the cruise caused an increase in the diastolic pressure, while the systolic pressure remained unchanged or decreased; the pulse pressure fell by 15-20 mm Hg, on the average. The data show that long-term summer cruises elicit definite changes in the cardiovascular system, which become apparent at the end of the first month. Consequently, during long cruises there should be periodic evaluation of the cardiovascular system.

2/2

USSR

KULIKOVA, L. V., VASIL'YEV, A. F., TROPIN, V. P., et al

"IR Method for the Analysis of a 45-% Wetting Powder PCC and DDT"

V sb. Khim. sredstva zashchity rast. (Chemical Plant Protective Agents), Moscow,, Vyp 3, 1973, pp 128-132 (from RZh-Khimiya, No 20, Oct 73, Abstract No 20N470)

Translation: An IR method has been proposed for the analysis of a 45-% wetting powder PCC (polychlorocamphene) and DDT. It has been established that presence of fillers, PAV and adhesion additive in the powder does not interfere with the analysis of PCC and DDT. Prior to the analysis the PCC and DDT solutions were filtered to remove the filler. Analytical bands used are 1310 cm-1 for PCC and 1100 cm-1 for DDT.

1/1

USSR

UDC 547.555+547.297

SVIRSKAYA, P. I., STRESBULAYEVA, A. I., NEGREBETSKIY, V. V., TIBANOV, P. V., VASIL'YEV, A. F., and BASKAKOV, Yu. A., All-Union Scientific Research Institute of Chemical Agents for Plant Protection

"Hydroxylamine Derivatives With Herbicidal Activity. 42. Reactions of Derivatives of N-Carbamoyl-N-arylhydroxylamines with Halides of Haloalkylcarboxylic Acids"

Leningrad, Zhurnal Organicheskoy Khimii, Vol 9, No 6, Jun 73, pp 1163-1171

Abstract: N-Carbamoyl-N-arylhydroxylamine derivatives, on reacting with halides of alpha- and beta-halopropionic acids, formed N-substituted O-alpha- or O-beta-halopropionyl derivatives of carbamoyl-N-arylhydroxylamines. Under the action of bases, O-beta-chloropropionylhydroxylamines were hydrolyzed to the initial hydroxylamines. Depending on the conditions of the reaction and the nature of the substituents, the N-substituted O-alpha-halopropionyl derivatives of carbamoyl-N-arylhydroxylamines, on being subjected to the action of bases, either split off hydrogen halide with the formation of O-acryloyl derivatives or underwent cyclization with the formation of 2-aryl-4-(alkyl)aryl-5-methyl-1,2,4-

1/2

- USSR

SVIRSKAYA, P. I., et al., Zhurnal Organicheskoy Khimii, Vol 9, No 6, Jun 73, pp 1163-1171

oxadiazine-3,6-diones. At high temperatures the O-alpha-halopropionyl and O-acryloyl derivatives readily underwent rearrangement into the corresponding derivatives of o-aminophenol. In the presence of triethylamine the O-alpha-halopropionyl-N-alkylcarbamoyl-o-aminophenols were converted as a result of recyclization into N-alpha-halopropionyl-N-alkylcarbamoyl-o-aminophenols. The compounds that have been synthesized and their physical properties are listed in tables.

2/2

USSR

SHEREMET, N. G., VASIL'YEV, A. F., KHASKIN, B. A., and MEL'NIKOV, N. N. UDC 541.127

"Kinetics of the Reaction of 4,4'-Dipyridyl With Trimethyl Phosphate"

Leningrad, Zhurnal Obshchey Khimii, Vol 43 (105), No 12, Dec 73, pp 2735-2738

Abstract: It was shown that the rate of the reaction of 4,4'-dipyridyl with trimethyl phosphate in presence of water can be described by the kinetic equation for a sequential-parallel two stage reaction. The reaction rate constant depends on the amount of water in the reaction mixture.

1/1

USSR

UDC 632.95

SURZHIKOVA, L. V., and VASIL'YEV, A. F.

"Quantitative Analysis of Atrazine, Simazine and Propazine in a Commercial Product and Wettable Powders from Infrared Absorption Spectra"

V sb. Khim. sredstva zashchity rast. (Chemical Agents for Plant Protection -- collection of works), Vyp 1, Moscow, 1970, pp 210-216 (from RZh-Khimiya, No 11, Jun 72, Abstract No 11N456)

Translation: The specimen is formed into pellets with KBr, and transmission is measured at absorption maxima of selected analytical bands, relative to tablets of pure KBr. A "Difference" method is used to determine optical densities. The theoretical errors of analysis are calculated, and the results are statistically analyzed.

1/1

USSR

UDC 630:54:541.571.9:547.871

TIBANOV, P. V., VASIL'YEV, A. E., BASKAKOV, Yu. A., LEVINSKIY, B. N., and MEL'NIKOVA I. A., All-Union Scientific-Research Institute of Chemical Agents for Plant Protection

"Herbicidal Derivatives of Hydroxylamine. XL. Energy of the Intramolecular Hydrogen Bond, and the Structure of Associates of O-Methylhydroxylamine Derivatives of sym-Triazines"

Riga, Khimiya Geterotsiklicheskikh Soyedineniy, No 1, Jan 1972, pp 124-127

Abstract: Experimental data have already suggested that simplification of methods and calculations for finding both the energy of the intramolecular bond, and the dimer-monomer entropy difference, will not substantially affect the accuracy of the results. Using the temperature relationship of the equilibrium constants, as determined by the ebullioscopic and cryoscopic methods, the authors determined both of the constants in question for seven compounds of the symtriazine group. Also obtained were the infrared spectrum for a solution of 2-chlor-4-di-propylamino-6-methoxyamino-sym-triazine in hexachlorobutadiene, and the relationship between (1) the association factor ($f = \bar{M}/M$, where $\bar{M}$ is the measured molecular weight, and M is the molecular weight of the monomer, and (2) the molar concentration. Figures for the

1/2

USSR

TIBANOV, P. V., et al., Khimiya Geterotsiklicheskikh Soyedineniy, No 1, Jan 1972, pp 124-127

intramolecular H bond energy and the dimer-monomer entropy difference turned out to be very close to those obtained by the accurate method of "peak" band intensities. The various data obtained are summarized in tables and graphs.

2/2

USSR

BASKAKOV, Yu. A., VOLOVNIK, L. L., VASIL'EV, A. F., ARYUTKINA, N. L., TIBANOV, P. V., and NEGREBETSKIY, V. V.

"Herbicidal Derivatives of Hydroxylamine. XXIV. The Reaction of Halides of Haloacetic Acids with Hydroxylamine Derivatives of Thiourea"

Khimiya Geterotsikl. Soyedin. [Chemistry of the Heterocyclic Compounds -- Collection of Works], No 3, Riga, Zinatne Press, 1971, pp 104-107. (Translated from Referativnyy Zhurnal Khimiya, No 5, Moscow, 1972, Abstract No 5N676 by the authors)

Translation: The reaction of $ClCH_2COCl$ with N-methylthiocarbamoyl-O-methylhydroxylamine (I) without any HCl acceptor produces 2-methoxyimino-3-methyl-4-oxo-1, 3-thiazolidinium (II), which is converted by heating in MeOH to 2-methoxyimino-3-methyl-1, 3-thiazolidin-4-one (III). Two point two (2.2) g $ClCH_2COCl$ is added to a solution of 2.4 g I in 100 ml ether at -20°, mixed for 2 hours (after which the temperature of the mixture is about 20°) and 3.6 g II are separated, yield 94 %, mp 160° (in a sealed capillary). A solution of II in MeOH is heated 1-2 hr on a water bath, the MeOH is distilled under vacuum, producing III, yield about 100 %, mp 88°. For a previous report see RZHKHim, 1969, 4B1038.

1/1

USSR

UDC: 632.95

BASKAKOV, YU. A., SVIRSKAYA, P. I., SHVINDLERMAN, G. S., MALYSHEVA, N. N., VSEVOLOZHSKAYA, N. B., TIBANOV, P. V. and VASIL'YEV, A. F.

"Herbicidal Derivatives of Hydroxyl Amine. XVII. Synthesis of N-Alkyl Carbamoyl-N-Arylhydroxyl Amines and Their o-Derivatives"

Biologicheski Aktivn. soyedin (Biologically Active Compounds -- Collection of Works), pp 70-76, Leningrad, Nauka Press, 1968 (from Referativnyy Zhurnal--Khimiya, No 2, 1970, Abstract No 2 N789)

Translation: Compounds with the general formula 3-X-4-Y-C_6H_3NHCOR (I), having fungicidal and herbicidal activity, are produced by the interaction of anilides or isomer chlorotoluidines and chloroanisidines with the corresponding acids in the presence of Zn powder or with their acid chlorides in the presence of HCl acceptors. Using the first method, 0.1 mol amine, 0.2 mol acid, and 0.001 g-atom Zn powder are heated several hours to complete distillation of the water; the reaction mixture is poured into ice water, the solid product is separated and crystallized. Synthesized are I (shown are R, X, yield in %, m.p. in °C): Y = Cl: Et, Me, 91, 99-100; Pr, Me, 76, 76-8; iso-Pr, Me, 82, 132-2; Et, MeO,

1/4

USSR

BASKAKOV, YU. A., et al, Referativnyy Zhurnal--Khimiya, No 2, 1970, Abstract No 2 N789)

39, 51-3; Pr, MeO, 43, 63-5, iso-Pr, MeO, 54, 99-100; Y = MeO: 53, Et, Cl, 53, 124-5; 78, PrCl, 78, 85-6; Pr, Cl, 65, 115-6.

Using the second method, 0.1 mol of the acid chloride of the corresponding acid is added to 0.1 mol of amine, 0.1 mol Me_2NPh in 60 ml absolute ether with cooling and agitation; mixing is performed for 2 hours at about 20^0, the mixture is treated with water, the ether layer is washed with solutions of HCl (acid), alkali, the solvent is removed and the product is crystallized from alcohol or a mixture of petroleum ether and benzene. Produced are I (shown are R, yield in %, m.p. in ^0C): X=Me, Y=Cl: Bu, 75.5, 70-1; iso-Bu, 80,8, 77-8; CH_2=CH, 75.6, 115-6; MeCH=CH, 93, 100-1, 5; 2-ClC_6H_4, 94, 134-5; CH_2ClCH_2Cl 84,4 97-8; $PhOCH_2$, 94,5, 108,5-9; $PhSCH_2$ 84, 96,5-7; X=Y=Cl:$Cl(CH_2)_3$, 67,6,86-7; $BuOCH_2CH_2$, 62, T. b.p. 224-5/2, $n^{19}D$ 1,5462; $PhOCH_2CH_2$, 96,7, 112-3; $PhO(CH_2)_3$, 51, 89-90; 4-$Cl=C_6H_4O$-$(CH_2)_3$, 79, 100; $PhSCH_2$, 92.5, 103-4; $BuSCH_2CH_2$, 53,5, dense mass; $PhSCH_2CH_2$, 75, 80-1; X=Cl. Y=Me: $PhOCH_2$, 97, 105-6; $BuOCH_2CH_2$, 73,1, b.p. 202/2, $n^{20}D$ 1.5275; $PhOCH_2CH_2$, 95,116-7; $PhO(CH)_2)_3$, 60 80-1; 4-$ClC_6H_4O(CH)_2)_3$, 86, 115-6, $PhSCH_2$,

2/4

USSR

BASKAKOV, YU. A., et al, Referativnyy Zhurnal--Khimiya, No 2, 1970, Abstract No 2 N789)

84, 85-6; $BuSCH_2CH_2$, 66, 50-1; $PhSCH_2CH_2$, 83, 85-6,5; $Cl(CH_2)_3$, 94,91-2; and I) (shown are R, X, Y, yield in %, m.p. in °C): $PhOCH_2$, Cl MeO, 75, 106.5; $PhOCH_2$, MeO, Cl, 83, 159-60.5. The reactions of the anilides of chloro substituted acids with Na alcoholates and phenolates are studied. I (R = $BuOCH_2$, X = Y = Cl) is produced from $3,4\text{-}Cl_2C_6H_3NHCOCH_2Cl$ and BuONa in anhydrous acetone without using a catalyst, yield 27.5%, m.p. 75-5.5°. When a-halogen acid anilides and Na alcoholate are used under ordinary conditions, derivatives of diketopiperazing are formed. For example, 4.72 g $3,4\text{-}Cl_2C_6H_3NHCOCH_2Cl$ are added to a solution of BuONa produced from 35 ml BuOH and 0.46 g Na. The mixture is boiled for 4 hours and evaporated under a vacuum. From the reaction products, after treatment with water and filtration, 1.5 g 1,4-bis-(3,4-dichlorophenyl)-2,5-diketopiperazine are separated, m.p. 245-6 (acetone). The same method is used to produce 1,4-bis-(3-chloro-4-methylphenyl)-2,5-diketopiperazine, yield 44%, m.p. 237-8°. Under the conditions of the preceding experiments, β-chloropropionic acid arylamides are converted to the corresponding acrylic acid arylamides, while

3/4

USSR

BASKAKOV, YU. A., et al., Referativnyy Zhurnal--Khimiya, No 2, 1970, Abstract No 2 N789)

the anilides of γ-chlorobutyric acid are converted to Δ-pyrrolidone derivatives. Thus, 3.4 g N-3,4-dichlorophenyl- -pyrrolidone are produced from 5.32 g 3,4-$Cl_2C_6H_3NHCO(CH_2)_3Cl$, m.p. 110-1° (alcohol), for which a mass spectrum is presented.

N. L. Poznanskaya

4/4

USSR

UDC 547.238+632.954

SVIRSKAYA, P. I., BASHAKOV, YU. A., SHVINDLERMAN, G. S., KUSKOVA, N. B., VASIL'YEV, A. F., and TIBANOV, P. V., All-Union Scientific Research Institute for Chemical Means of Plant Protection, Moscow, State Committee for Chemistry USSR

"Herbicidal Derivatives of Hydroxylamine
XXIX. N-Arylcarbamoyl-N-alkylhydroxylamine and Their Derivatives"

Moscow, Zhurnal Organicheskoy Khimii, Vol 6, No 2, Feb 70, pp 274-280

Abstract: The N-arylcarbamoyl-N-alkylhydroxylamines were obtained by reacting arylisocyanates with N-alkylhydroxylamines or their chlorohydrates in inert organic solvents such as benzene, toluene, ethyl acetate, in which the reaction is quite energetic. The products formed are insoluble in these solvents, giving almost quantitative yields of quite pure materials. The reaction of arylisocyanates with alkylhydroxylamines hydrochlorides could be carried out in aqueous ether or aqueous ethyl acetate. Acetates were prepared by known methods but proved to be unstable in presence of acids and bases. Some of the O-acyl-N-arylcarbamoyl-N-methylhydroxylamines exhibited high and quite selective herbicidal activity.

1/1

1/2 018 UNCLASSIFIED PROCESSING DATE--27NOV70

TITLE--HERBICIDE DERIVATIVES OF HYDROXYLAMINES. XXXII. SYNTHESIS AND REACTIONS OF N,ARYLCARBAMOYL,N,ARYLHYDROXYLAMINES -U-

AUTHOR-(05)-SVIRSKAYA, P.I., BASKAKOV, YU.A., VASILYEV, A.F., TIBANOV, P.V., STREBULAYEVA, A.I.

COUNTRY OF INFO--USSR

SOURCE--ZHURNAL ORGANICHESKOY KHIMII, 1970, VOL 6, NR 2, PP 292-300

DATE PUBLISHED-------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--HERBICIDE, HYDROXYLAMINE, CHEMICAL SYNTHESIS, INSECTICIDE, FUNGICIDE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3003/1201

STEP NO--UR/0366/70/006/002/0292/0300

CIRC ACCESSION NO--AP0130215

UNCLASSIFIED

2/2 018 UNCLASSIFIED

CIRC ACCESSION NO--AP0130215 PROCESSING DATE--27NOV70

ABSTRACT/EXTRACT--(U) GP-0-- ABSTRACT. THE TITLE COMPOUNDS CONTAINING VARIOUS SUBSTITUENTS IN BOTH AROMATIC RINGS WERE PREPARED BY THE REACTION OF ARYLHYDROXYLAMINES WITH ARYL ISOCYANATES X SUBN C SUB6 H SUB5MINUSN NHOH PLUS Y SUBM C SUB6 H SUB5MINUSM NCO YIELDS X SUBN C SUB6 H SUB5MINUSN H(OH)CONHC SUB6 H SUB5MINUSM Y SUBM. COMPOUNDS I WHERE X EQUALS 4,CH SUB3 ARE THE LEAST STABLE AND DECOMPOSE ON SLIGHT HEATING, OR EVEN ON RECRYSTALLIZATION FROM METHYLENE CHLORIDE. THE FREE HYDROXYL GROUP IN COMPOUNDS I CAN BE READILY ACYLATED WITH ACID ANHYDRIDES AND ACYL CHLORIDES TO FORM COMPOUNDS II X SUB N C SUB6 H SUB5MINUSN N9OCOR)CONIIC SUB6 II SUB5MINUSM Y SUBM. COMPOUNDS I AND II ARE PRACTICALLY INACTIVE AS INSECTICIDES, BUT SOME OF THEM ARE SYSTEMIC FUNGICIDES. FACILITY: VSESOYUZNYY NAUCHNO-ISSLEDOVATEL'SKIY INSTITUT KHIMICHESKIKH SREDSTV ZASHCHITY RASTENIY.

UNCLASSIFIED

USSR UDC 547.435.2+547.238+632.954

SVIRSKAYA, P. I., BASKAKOV, YU. A., VASILYEV, A. F., TIBANOV, P. V., and STREBULAYEVA, A. I., All-Union Scientific Research Institute for Chemical Means of Plant Protection, Moscow, State Committee for Chemistry USSR

"Herbicidal Derivatives of Hydroxylamines XXXII. Synthesis and Reactions of N-arylcarbamoyl-N-arylhydroxylamines"

Moscow, Zhurnal Organicheskoy Khimii, Vol 6, No 2, Feb 70, pp 292-300

Abstract: The authors synthesized a series of variously substituted N-arylcarbamoyl-N-arylhydroxylamines and their acetates by reacting arylhydroxylamines with arylisocyanates in anhydrous organic solvents. The products were checked for herbicidal activity but were practically inactive. Some exhibited fungicidal activity of the systemic type. The acetates proved to be more stable compounds with high melting points. Studies of IR spectra have shown that in solution these hydroxylamines prefer a trans form; when the concentration is increased the cis form begins to show up. The acetates showed spectra which led to the conclusion that they may have cis-trans conformations not only of the CONH group, but also of aryl and acyl groups.
1/1

USSR

UDC 547.238 + 547.239

KONSTANTINOVA, N. V., SHVINDLERMAN, G. S., VASIL'YEV, A. F., and BASKAKOV, YU. A., All-Union Scientific Research Institute for Chemical Means of Plant Protection, Moscow, State Committee for Chemistry USSR

"Herbicidal Derivatives of Hydroxylamine XXXV. Reaction of N-Alkylcarbamoyl-N-alkylhydroxylamine With Isocyanates"

Moscow, Zhurnal Organicheskoy Khimii, Vol 6, No 2, Feb 70, pp 300-306

Abstract: A series of novel N-alkylcarbamoyl-N-alkylhydroxylamines was synthesized by reacting N-alkylhydroxylamines with alkylisocyanates. An unusual reaction was noted when these products were O-carbamoylated -- one isocyanate group could apparently be replaced by another, more reactive one. It was found that at $\geqslant 40^{\circ}$ a molecule of N-alkylcarbamoyl-N-alkylhydroxylamine dissociates reversely into N-alkylhydroxylamine and alkylisocyanate. This phenomenon could be used in explaining the mechanism of transisocyanation. No biological data are reported in this paper, only melting points of the starting hydroxylamines and their reaction products.

1/1

USSR

UDC 612.822.3

KOTELENKO, L. M., and VASIL'YEV, A. G., Leningrad State University

"Electrical Responses of the Bat Auditory Cortex to Ultrasound Stimuli at Different Fill Frequencies"

Kiev, Neyrofiziologiya, No 5, 1971, pp 526-532

Abstract: The acoustic signals of vespertilionid (Myotis oxygnathus) and horseshoe (Rhinolophus ferrum equinum) bats differ significantly from one another. The former emit frequency modulated pulses while the latter emit monochromatic pulses. Study of the electrical reactions and action potentials of individual neurons in the auditory cortex of these two bat species showed the vespertilionids to be maximally sensitive to ultrasound at frequencies of 10 to 50 kHz, the horseshoe bats at frequencies of 10 to 40 and 82 to 84 kHz. The shape of the response regions of single neurons are similar in the two species with the exception of neurons in the horse shoe bats which have three such regions with characteristic frequencies at 27 to 28, 40 to 42, and 80 to 84 kHz. Many neurons in these bats unlike the vespertilionids, have narrow response regions with characteristic frequencies in the 70 to 90 kHz range. Low thresholds were recorded at 78 to 86 kHz after exclusion of the stimulus. Responses to such exclusion generally arose in the frequency band where on-responses were recorded.

1/1

USSR

VASIL'YEV, A. G., and ANDREYEVA, N. G., Leningrad State University imeni A. A. Zhdanov

UDC 621.826.5

"Electrical Responses of Medial Geniculate Bodies in Vespertilionidae and Rhinolophidae to Ultrasonic Stimuli of Different Frequencies"

Kiev, Neurofiziologiya, Vol 3, No 2, Mar/Apr 71, pp 138-144

Abstract: Summated electrical responses and single action potentials of medial geniculate body neurons were investigated in Vespertilionidae and Rhinolophidae. Vespertilionidae are most sensitive to ultrasound frequencies of 10-40 and 65-80 kilocycles; this is the frequency of their natural sonar system. Rhinolophidae are most sensitive to frequencies of 10-70 and 81-86 kilocycles, while the basic frequency of their sonar system is 80 kilocycles, their threshold to this frequency is 15-30 decibels higher than to the above-mentioned range. The minimum thresholds for discontinuation of stimulation lie between 50 and 60 kilocycles for Vespertilionidae and between 78-80 kilocycles for Rhinolophidae. The single neuron response areas in both species are similar to those observed in other acoustic centers of these bats and in the medial geniculate bodies of other mammals. In Rhinolophidae,

1/2

USSR

VASIL'YEV, A. G., and ANDREYEVA, N. G., Neurofiziologiya, Vol 3, No 2, Mar-Apr 71, pp 138-144

some neurons highly sensitive to 80 kilocycles have an almost equal sensitivity to 40 and 27 kilocycles. Neurons responding to 80-90 kilocycles display the greatest selectivity to frequencies.

2/2

USSR

UDC 612.828.014.45

VASIL'YEV, A. G., and TIMOSHENKO, T. Ye., Leningrad State University imeni A. A. Zhdanov

"Electrical Responses of Superior Olives in Vespertilionidae and Rhinolophidae to Ultrasonic Stimuli With Various Fill Frequencies"

Kiev, Neyrofiziologiya, Vol 5, No 1, Jan/Feb 73, pp 33-39

Abstract: Records of integrated electrical activity and of individual action potentials indicate that the superior olivary complex in Vespertilionidae, which emit echo-location signals with frequency modulation ranging from 30 to 120 khz, is maximally sensitive to ultrasounds of 10-40 khz. Upon cessation of stimulation with any frequency, the superior olives respond with prolonged oscillations. In Rhinolophidae, which emit almost monochromatic echo-location sounds of a basic frequency of 80 khz, the superior olivary complex is maximally sensitive to two frequency bands, 10-40 and 82-86 khz, while stimuli of 80 khz must be 20-30 db louder in order to induce a response. The response areas of single neurons are in both species of bats similar to those observed in other mammals, except for the reaction to the 70-90 khz band. The Rhinolophidae have a large number of neurons which are sharply attuned to 80-90 khz and whose response varies depending on the fill frequency of the stimulus. Within

1/2

USSR

VASIL'YEV, A. G. and TIMOSHENKO, T. Ye., Neyrofiziologiya, Vol 5, No 1, Jan/Feb 73, pp 33-39

a limited range of stimulus intensity, they respond with a phasic discharge covering a wide frequency range and a tonic discharge at the characteristic frequency. It is believed that these neurons analyze both the frequency and the intensity of the stimuli.

2/2

USSR

VASIL'YEV, A. I., MAMONOV, A. A., TSIBIN, G. I. UDC: 620.17

"Some Problems in Developing Precision Strain-Gauge Instruments for Measuring Force and Mass"

Tr. Sib. NII metrol. (Works of the Siberian Scientific Research Institute of Metrology), 1971, vyp. 13, pp 7-9 (from RZh-Mekhanika, No 7, Jul 72, Abstract No 7V1156)

Translation: It is shown that the material of the elastic pickup element of an electronic strain-gauge device for measuring mass or force must have high reproducibility of elastic deformation, i. e. it must have a minimum level of micr(elastic deformations. It is found that alloy steels widely used for making elastic elements correspond to this requirement in the normalization state. A design is described for a 10 000 kg electronic strain-gauge beam balance pickup in which the transducer converting deformation to an electric signal is made in the form of a three-electrode capacitor with two fixed working electrodes. The pickup is hermetically sealed and has a temperature compensation range of 20±15°C, which means that masses can be measured with a precision

1/2

USSR

VASIL'YEV, A. I. et al., Tr. Sib. NII metrol., 1971, vyp. 13, pp 7-9

to 0.01% in a range from 1 000 to 10 000 kg at a distance of up to 50 m. The measurement system contains a device for correcting readings as a function of the local value of acceleration due to gravity. N. A. Petrova.

2/2

USSR

UDC 616.282.3-085.2

KURASHVILI, A. Ye., Professor, VASIL'YEV, A. I., Docent, and LI, M., Otolaryngological Clinic, Military Medical Academy imeni S. M. Kirov, Leningrad

"The Effectiveness of Treating Some Vestibular Disorders With a Complex of Pharmacological Agents"

Moscow, Vestnik Otorino-Laringologii, No 3, May/Jun 71, pp 44-48

Abstract: Two groups of clinical patients -- 15 persons with Meniere's disease and five persons with vestibular pathology of unknown etiology -- were treated with a compound drug containing 0.25 g of spasmolytin, 0.025 g of suprastine, 0.01 g of thiamine bromide, 0.5 g of analgin, and 0.005 g of phenamine. This compound was administered three times per day for 10 days; in some cases, the treatment was repeated after a 10-day interval. As a result of this chemotherapy, the general condition of the patients improved, vertigo disappeared, the duration of experimental nystagmus and sensory reactions decreased in most cases, and vestibular asymmetry disappeared. The electroencephalogram became normal in a number of patients. Because of its effectiveness and absence of side effects, the compound is recommended for clinical use.

1/1

USSR

VASIL'YEV, A. M., DE, S. T., and LOGINOV, A. V.

UDC: 621.378.3

"Laboratory Argon Laser With a Discharge Channel of Beryllium Oxide"

Novosibirsk, Avtometriya, No 5, 1972, pp 125-126

Abstract: Details are given of an argon ion laser, developed by the authors, which is capable of standing up under long use in the laboratory. A photograph of the laser is shown. The discharge channel of the device is a beryllium oxide tube 350 mm long and 3 mm in diameter. The choice of this material was dictated by the fact that it has the highest heat conductivity of all the insulating ceramics and can stand thermal shock. The optical resonator consists of a spherical mirror and a plane mirror from which the radiation emerges. Oscillation occurs in six lines in the 4579-5145 A range, with a total power of five watts. It is noted that most industrially produced ion lasers in the Soviet Union have quartz discharge channels. This is a mistake, in the authors' opinion, since quartz has low heat conductivity and consequent high inner wall temperatures, with resultant shorter life. They express

1/2

USSR

VASIL'YEV, A. M., et al, Avtometriya, No 5, 1972, pp 125-126 UDC: 621.378.3

their gratitude to Yu. Ye. Nesterekhin and A. G. Kozachok for their attention to the work.

2/2

Acc. Nr: AP0046221 V Ref. Code: UR0646

PRIMARY SOURCE: Teoreticheskaya i Matematicheskaya Fizika, 1970, Vol 2, Nr 2, pp 153-168

THE THEORY OF REPRESENTATIONS FOR A TOPOLOGICAL (NON-BANACH) ALGEBRA WITH INVOLUTION

Vasil'yev, A. N.

The definition is given of the *-representation of a topological (non-Banach) algebra with involution. The notions of the symmetrical, conjugate and self-conjugate representations are introduced. The conjugation operation for the representation is shown to possess the properties close to those of the usual cojugation for the linear operators in Hilbert space.

The various forms of algebraic closeness of representations, such as isomorphism, similarity and unitary equivalence are defined and investigated.

The notions of the large and the small commutant of a given symmetrical representation are introduced and the triviality of the large commutant is shown to be equivalent to the purity of the generating functional. It is shown also that the structure of self-conjugate representation is much simpler than that of symmetrical one. In particular, the notions of the large and the small commutant coincide in the case of the self-conjugate representation.

DI 21

1/1

REEL/FRAME
19781337

UDC 621.382.3

USSR

FEDOTOV, YA. A., SIDOROV, V.G., GUSEV, V.A., VASIL'YEV, A.P., REMIZOVA, G.V.

"Definition Of The Determinant Factors During Physico-Mathematical Investigation Of The Quality Of Alloy-Type Low-Power Transistors"

Elektron. tekhnika. Nauchno-tekhn. sb. Poluprovodn. pribory (Electronic Technology. Scientific-Technical Collection. Semiconductor Devices), 1970, No 1(51), pp 3-24 (from RZh--Elektronika i yeye primeneniye, No 12, December 1970, Abstract No 12B176)

Translation: A method is proposed for analysis of the quality of alloy-type low-power transistors with the aid of physico-mathematical methods which define the determinate factors effecting the change of the individual parameters. Author's Summary.

1/1

USSR

UDC 621.382.2:546.19'681

KULISH, U.M., VASIL'YEV, A.P., VYATKIN, A.P., YELISEYEV, P.G., GEORMOGENOV, V.P.

"Effect Of Formation Conditions On The Electrical Properties Of Epitaxial P-N Junctions In Gallium Arsenide"

V sb. Arsenid galliya (Gallium Arsenide--Collection Of Works), Issue 3, Tomsk, Tomsk University, 1970, pp 152-162 (from RZh--Elektronika i yeye primeneniye, No 3, March 1971, Abstract No 3B384)

Translation: The electrical properties were investigated of p-n junctions in GaAs obtained by the method of liquid epitaxy. The electrical characteristics of p-n junctions obtained in a narrow temperature interval depend on the epitaxy temperature, which is explained by the corresponding dependences of the solidus curves of the corresponding quasi-binary systems. During subsequent heat treatment even short-duration annealings lead to a leveling of the electrical characteristics of "abrupt" p-n junctions and a disappearance of the dependence of their parameters on the epitaxy temperature. The crystallographic orientation of the substrate significantly influences the electrical and optical properties of laser junctions. Acceptor impurities exert various effects on the electrical and optical properties of epitaxial laser semiconductor diodes. 8 ref. Summary.

1/1

UDC 621.318.5

USSR

Dr. of Physico-Mathematical Science RABKIN, L.I., Engineers LEYZAN, L.I., SHUL'MAN, S.M., VASIL'YEV, A.S.

"Relay Based On Magneto-Controlled Contacts With Use Of Ferroelast"

Moscow, Pribory i sistemy upravleniya, No 11, Nov 1971, pp 32-33

Abstract: It is concluded that Type FNTs ferroelast is a promising magneto-dielectric material which will find wide use in switching technology, particularly in relays based on magneto-controlled contacts. The parameters of Type FNTs-17 ferroelast are presented. Use of ferroelast makes it possible to increase the sensitivity of the relay, to decrease its dimensions and consumable power. Subsequent work must be conducted in the direction of increasing the thermal stability, the insulation strength, and improvement of the magnetic and elastic properties of the ferroelast which in addition will make it possible to expand the range of its application. 6 ref. 1 fig. 2 tab.

1/1

UDC: 621.372.542.33

USSR

VASIL'YEV, A. S., Active Member of the Scientific and Technical Society of Radio Engineering, Electronics and Communications imeni A. S. Popov

"Single-Element Regulation of the Resonance Frequency of a Null Filter With Distributed RC Structure"

Moscow, Radiotekhnika, Vol. 26, No 6, Jun 71, pp 43-48

Abstract: A circuit is proposed for a null filter in which the resonance frequency is adjusted by varying one resistance. Computational formulas are given and the actual control limits are established. The possibilities for electronic frequency tuning are studied. It is found that frequency tuning should be toward a reduction in resonance frequency from the initial value, beginning with very small transfer constants. This makes it possible to vary the resonance frequency by a factor of 3-4 while maintaining the selective properties of the filter (and those of the selective amplifier) practically constant with comparatively low sensitivity to detuning at low supply voltages. Detuning with single-element regulation increases with the adjustment range, and also as the resonance frequency approaches that of the classical circuit. Thus the permissible adjustment range decreases with an increase in the Q of the selective amplifier. One disadvantage of the proposed circuit is that the resonance frequency decreases in approximate proportion to the square root of the transfer constant. This means that the transfer constant must be increased by an order of magnitude or more to reduce the resonance frequency by a small factor. Electronic frequency tuning can be achieved by using a unipolar transistor as the controlling resistor, selecting a steep segment of the sink

characteristics for operation, where a change in voltage across the gate causes a considerable change in output impedance. However, the circuit may require thermostatic control since a slight instability of transistor characteristics may lead to instability of the resonance frequency.

1/1

UDC: 621.372

USSR

VASIL'YEV, A. S.

"Circuit Reduction of the Resonance Frequency of a Null Filter With Distributed RC-Structure"

V sb. Mikroelektronika. Vyp. 1 (Microelectronics. No 1--collection of works), Moscow, Atomizdat, 1971, pp 88-96 (from RZh-Radiotekhnika, No 6, Jun 71, Abstract No 6A102)

Translation: The author considers the possibility of reducing the resonance frequency of a null filter used in low-frequency selective amplifiers, assuming that the filter is made by microelectronics methods. A circuit is described for a filter based on a distributed RC-structure. The device is distinguished by inclusion of an inverting aperiodic voltage amplifier which reduces the resonance frequency without increasing the impedances and capacitance of the RC-structure. The limitations of the circuit are discussed. Two illustrations, bibliography of three titles. N. S.

1/1

USSR UDC: 621.396.6-181.5

AGAKHANYAN, T. M., VASIL'YEV, A. S., GALITSKIY, V. V., DONCHUK, S. D., PETROV, G. V., SMOLKO, G. G.

"Hybrid Circuits Utilizing Thin-Film Distributed RC Structures"

V sb. Mikroelektronika. Vyp. 1 (Microelectronics. No 1--collection of works), Moscow, Atomizdat, 1971, pp 31-62 (from RZh-Radiotekhnika, No 6, Jun 71, Abstract No 6V185)

Translation: Results found in development of microelectronic circuits utilizing thin-film distributed RC structures are taken as a basis for analysis of the possibilities of constructing a number of amplifiers, sine-wave generators and relaxation circuits in the form of hybrid microcircuits. A number of recommendations are given on making microcircuits. Thirty-seven illustrations, bibliography of thirty-six titles. N. S.

1/1

USSR

UDC 597.0/5-11

VASIL'YEV, A. S., and GLEYZER, S. I., Atlantic Scientific Research Institute of Fishery and Oceanography and Kaliningrad Technical Institute of the Fish Industry and Fishery

"Changes in the Activity of the River Eel Anguilla anguilla L. in Magnetic Fields"

Moscow, Voprosy Ikhtiologii, Vol 13, No 2, 1973, pp 381-383

Abstract: The effect of artificially generated magnetic fields on the motor activity of young common (river) eels Anguilla anguilla L. in fresh and salt water was investigated. A magnetic field with a strength of 0.2 T increased the motor activity of the fish by 10-20% above normal. The aftereffect in the subsequent absence of the field was expressed in a drop of activity by 38% below normal. During a gradual decrease of the magnetic field strength from 0.3 T to zero in fresh water, the motor activity of the fish decreased in a regular manner, dropping to half its initial value. With increasing salinity of the water, the stimulating effect of magnetic fields in increasing the motor activity of the eels increased. This was due to an increasing role of the magnetohydrodynamic effect. In a uniform magnetic field, the eels, in 80% of cases, tried to swim in the direction of the force line. This indicated that the magnetic field exerted an irritating effect on the fish, which they tried to avoid. The

1/2

USSR

VASIL'YEV, A. S. and GLEYZER, S. I., Voprosy Ikhtiologii, Vol 13, No 2, 1973, pp 381-383

effects of the earth's magnetic field on the motion of eels, which migrate over very long distances in the period before spawning, have been studied in earlier work by the authors. The study of the effect of artificially created magnetic fields on fish is of interest from both the ecological standpoint and that of controlling the behavior of fish.

2/2

USSR

UDC 621.396.6.002.72(088.8)

VASIL'YEV, A. T.

"A Device for Mounting Transistors on a Printed Circuit Board"

USSR Author's Certificate No 255385, Filed 5 May 68, Published 31 Mar 70 (from RZh-Radiotekhnika, No 10, Oct 70, Abstract No 10V303 P)

Translation: The proposed device for mounting transistors on printed circuit boards contains a cartridge for the transistors, a lead shaping mechanism which also locates the transistors on the board, and a die. As a distinguishing feature of the device, operational reliability is improved by making the lead shaping and transistor locating device with two arms mounted on a common axle for preliminary separation of the leads. One of these arms is made in the form of a single fork, and the other takes the form of a double fork. The unit also contains a final separation punch equipped with locating grooves and a separating wedge, a punch for bending the leads through 90°, a punch for bending the leads through 180° with three guides for the leads, and a punch for lead orientation with V-shaped grooves on the lateral surfaces of the punch.

1/1

USSR

BARANOVSKIY, A. L., VASIL'YEV, A. V., PAKHAR'KOVA, A. I.

"Electrostimulator"

Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 17, 1973, USSR Author's Certificate No 376097, p 16

Translation: An electrostimulator is introduced which contains a low-frequency stimulating pulse generator and an isolating device comprising a high-frequency generator, a low-capacitance transformer and a low-frequency filter. The device is distinguished by the fact that in order to decrease the artefact, it contains a modulator-breaker connected through a square pulse shaper to the high-frequency generator, the signal input of the modulator-breaker is connected to the low-frequency stimulating pulse generator, and the output is connected through a linear amplifier to the primary winding of the low-capacitance transformer, the square pulse shaper is connected, in addition to the primary winding of the additional low-capacitance transformer introduced into the structural design of the electrostrimulator, and the secondary winding of the latter is connected to the input of the reference voltage of the phase-sensitive detector.

1/1

USSR UDC: 8.74

VASIL'YEV, A. V., PYATETSKIY-SHAPIRO, I. I., RADVOGIN, Yu. B., Institute of Applied Mathematics, Academy of Sciences of the USSR

"Modeling Processes of Sorting, Invasion and Aggregation of Cells"

Moscow, Modelirovaniye protsessov sortirovki, invazii i aggregatsii kletok (cf. English above), 1972, 49 pp, ill. bibl. 11 titles (manuscript deposited in VINITI 16 Nov 72, No 5087-72 Dep.) (from RZh-Kibernetika, No 7, Jul 73, abstract No 7V673 Dep. by the authors)

Translation: An investigation is made into the local mechanisms responsible for sorting, invasion and aggregation of cells. It was found that 10-24 bonds per cell is sufficient for sorting of aggregates whose dimensions are comparable with actual sizes. It is shown that each cell is displaced by 3-5 cellular diameters on the average in the sorting process. For modeling of invasion it is shown that each cell must be bound to 2-3 layers of neighboring cells.

1/1

1/2 034 UNCLASSIFIED PROCESSING DATE--04DEC70

TITLE--INFLUENCE OF SOME ADDITIVES ON THE CRITICAL, PARTICLE DIAMETER AND RATE OF COMBUSION OF MIXTURES OF ALUMINUM WITH GELLED WATER -U-

AUTHOR-(03)-VASILYEV, A.V., GORBUNOV, V.V., SHIDLOVSKIY, A.A.

COUNTRY OF INFO--USSR

SOURCE--IZV. VYSSH. UCHEB. ZAVED., KHIM. KHIM. TEKHNOL. 1970, 13(3), 318-21

DATE PUBLISHED--------70

SUBJECT AREAS--PROPULSION AND FUELS

TOPIC TAGS--GEL, AQUEOUS SOLUTION, NICHROME ALLOY, CELLULOSE, COMBUSTION RATE, ALUMINUM, ALUMINUM FLUORIDE, LITHIUM FLUORIDE, POTASSIUM COMPOUND, SODIUM COMPOUND

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3008/0601 STEP NO--UR/0153/70/013/003/0318/0321

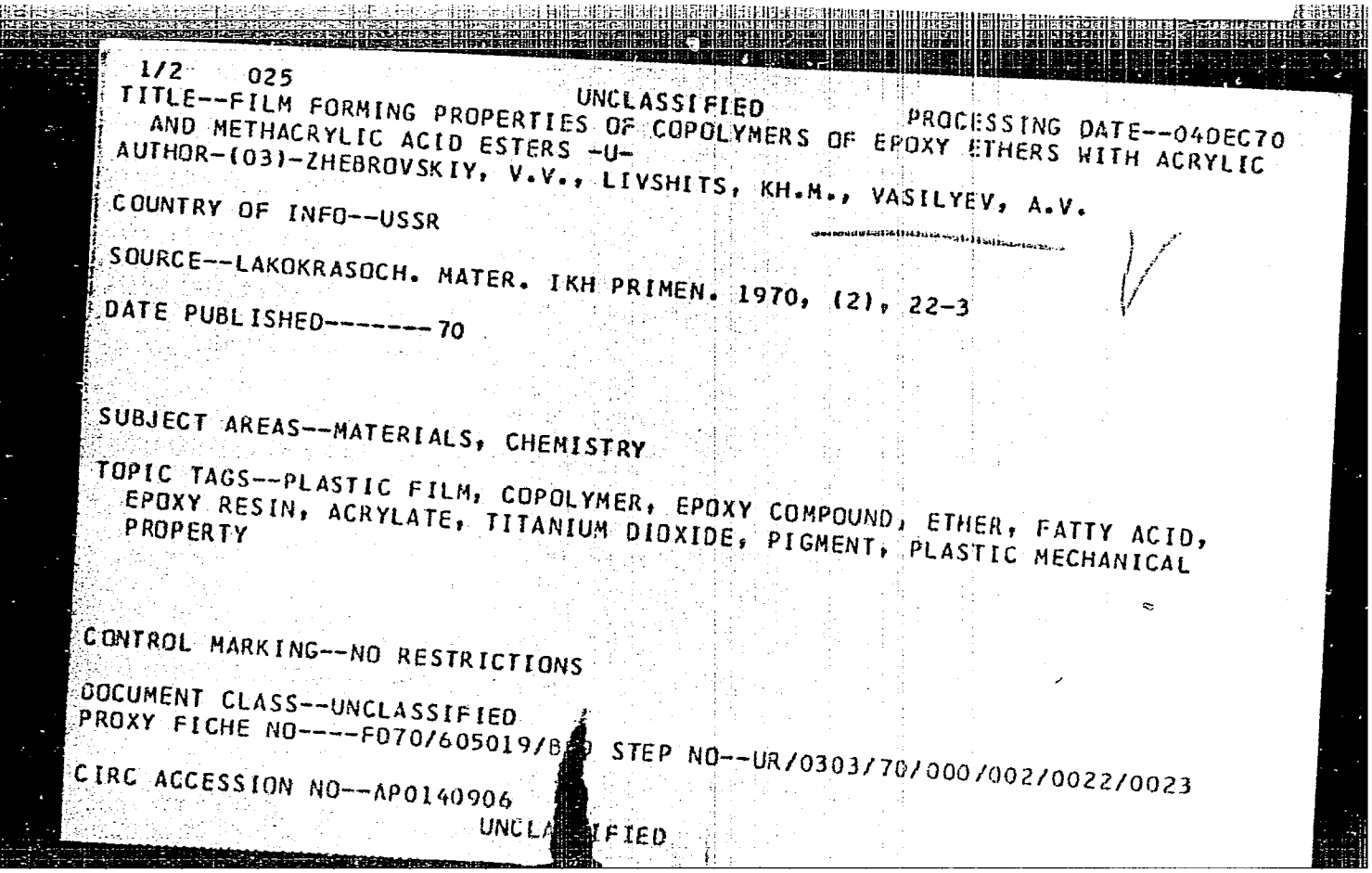
CIRC ACCESSION NO--AT0137686

UNCLASSIFIED

UNCLASSIFIED PROCESSING DATE--04DEC70

2/2 034
CIRC ACCESSION NO--AT0137686
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE ADDN. OF 1-5PERCENT LIF, NAF, KF, OR ALF SUB3 TO A MIXT. OF POWD. AL (L MU AV. PARTICLE SIZE) AND A STOICHIOMETRIC AMT. OF H SUB2 O GELLED WITH 3PERCENT NA CM-CELLULOSE, INCREASES THE INFLAMMABILITY OF THE MIXT. WHEN SUBJECTED TO A HEATED NICHROME SPIRAL, AS INDICATED BY VELOCITY AND TIME OF BURNING, AND CRIT. SIZE OF COMBUSTIBLE AGGREGATES. THE READILY SOL. NAF AND KF ARE MORE EFFECTIVE THAN LIF AND ALF SUB3. AN INCREASE IN PH OF NAF AND KF SOLNS. WHEN MIXED WITH SUSPENDED AL(OH)SUB3 SHOWS THAT THESE SALTS AFFECT THE FLAMMABILITY OF AL BY DESTROYING AN OXIDE FILM. FACILITY: MOSK. INST. KHIM. MASHINOSTR., MOSCOW, USSR.

UNCLASSIFIED



1/2 025 UNCLASSIFIED PROCESSING DATE--04DEC70

TITLE--FILM FORMING PROPERTIES OF COPOLYMERS OF EPOXY ETHERS WITH ACRYLIC AND METHACRYLIC ACID ESTERS -U-

AUTHOR-(03)-ZHEBROVSKIY, V.V., LIVSHITS, KH.M., VASILYEV, A.V.

COUNTRY OF INFO--USSR

SOURCE--LAKOKRASOCH. MATER. IKH PRIMEN. 1970, (2), 22-3

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS, CHEMISTRY

TOPIC TAGS--PLASTIC FILM, COPOLYMER, EPOXY COMPOUND, ETHER, FATTY ACID, EPOXY RESIN, ACRYLATE, TITANIUM DIOXIDE, PIGMENT, PLASTIC MECHANICAL PROPERTY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY FICHE NO----FD70/605019/B[illegible] STEP NO--UR/0303/70/000/002/0022/0023

CIRC ACCESSION NO--AP0140906

UNCLASSIFIED

2/2 025 UNCLASSIFIED

CIRC ACCESSION NO--AP0140906 PROCESSING DATE--04DEC70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ENAMELS WERE PREPD. BY COPOLYMN. OF AN EPOXY ETHER (BASED ON FATTY ACIDS OF DEHYDRATED CASTOR OIL AND EPOXY RESIN E-44) WITH BU ACRYLATE AND BU METHACRYLATE IN THE PRESENCE OF CUMENE HYDROPEROXIDE. THE ENAMELS (CONTG. TIO SUB2 AS A PIGMENT) EXHIBITED SUPERIOR PHYS. MECH. PROPERTIES AND LIGHTFASTNESS.

UNCLASSIFIED

USSR

UDC: 662.220

VASILIYEV, A. V., GORBUNOV, V. V. and SHIDLOVSKIY, A. A., Moscow Chemical Machine Building Institute, Moscow, Ministry of Higher Education USSR

"The Effect of Certain Additives on the Critical Diameter and the Rate of Combustion of Aluminum - Gelatinized Water Mixtures"

Ivanovo, Khimiya i Khimicheskaya Takhnologiya, Vol XIII, No 3, 70, pp 318-321

Abstract: The authors studied the effect of addition of 1 - 5% of Li, Na, K, and Al fluorides to a standard mixture of Al $\angle (Al + H_2O)_{stoich} \rangle$ as a means of overcoming the retardation of ignition and combustion caused by the presence of a stable oxide film on the Al particles. All of these additives improved inflammability and reduced critical diameter of combustion at atmospheric pressure, the highly soluble NaF and KF being the most effective. From the significant increase in pH of aqueous NaF and KF upon the addition of an $Al(OH)_3$ suspension, it is assumed that the improvements noted are the result of intensive disruption of the oxide film by the hot solutions.

1/1

Acc. Nr: AP0051929 Ref. Code: UR0219

PRIMARY SOURCE: Byulleten' Eksperimental'noy Biologii i Meditsiny, 1970, Vol 69, Nr 2, pp 94-98

CLONE-FORMATION IN MONOLAYERED CULTURES OF THE BONE MARROW AND THE SPLEEN

R. K. Chaylakhyan, A. Ya. Fridenshteyn, A. V. Vasil'yev

H. F. Gamaleya Institute of Epidemiology and Microbiology, Academy of Medical Sciences of the USSR, Moscow

In monolayered curtures of the bone marrow and the spleen of guinea pig beginning from the 10th day discrete foci of fibroblast-like cells arose. Two methods were used to elucidate the nature of these foci. Investigation was made of the number of foci per cells fixed to the slide. A chromosome analysis was also carried out on total preparations of the cultures containing a mixture of equal numbers of the spleen cells of males and females.

These investigations indicate that the foci are cell clones, which are in accordance with a linear growth of the number of foci depending on the number of cultured cells.

USSR

VAVILIN, G. I., VASIL'YEV, A. V., IL'INA, T. B., KROPACHEV, V. A., LAVRENT'YEVA, Ye. M., RABINOVICH, I. M., and TRUKHMANOVA, L. B., Institute of High-Molecular Compounds, Academy of Sciences USSR; State Scientific Research Institute of Tuberculosis, Ministry of Health of RSFSR; Leningrad Scientific Research Institute of Antibiotics, Ministry of Medical Industry USSR

"Use of Polymers for Modification of Antibacterial Preparations"

Riga, Fiziologicheski i Opticheski Aktivnyy Polimernyye Veshchestva, "Zinatne," 1971, pp 175-180

Abstract: Antibacterial preparations were modified by forming strong chemical bonds with polymers, and by protective coatings. Mixtures of p-aminosalicylic acid (PASA), streptomycin and hydrazine of isonicotinic acid (HINA) with polyvinyl alcohol (PVA) and polyvinylpyrrolidone (PVP), gels of iodopolyvinyl alcohol, as well as polymer preparations with PASA and HINA were studied. Coating of streptomycin, PASA, and HINA were accomplished with acetylphthalylcellulose (APC) and with its ammonium salt (NH_4-APC). All prepared antitubercular preparations preserved their potency in vitro for not less than 1 year. Therapeutic properties of PASA, tubaside, and streptomycin with polymers were tested on dogs and guinea pigs. The long-lasting effect of preparations depended first of all on the polymer-carrier, its mol. wt.,

1/2

USSR

VAVILIN, G. I., et al., Fiziologicheski i Opticheski Aktivnyye Polimernyye Veshchestva, "Zinatne," 1971, pp 175-180

and the method of administration into the animal organism. Best results were shown by polymers with mol. wt. of 50,000-60,000. Coating of tubaside, PASA, and streptomycin with APC and NH_4-APC eliminated some side effects, excessive production of gastric juices, increased tolerance by patients who could not take them without coatings, and prolonged effectiveness of all drugs tested. PASA pills with APC coating preserved their antimicrobial effect for 2 years (1.5 years for uncoated pills). Solubility of APC and NH_4-APC coatings in artificial gastric juices at pH 7.4 was 20 and 15 min, respectively, and 3 hr at pH 1.2. Some coated pills reached small intestine before being completely decomposed. NH_4-APC coatings were more penetrable by fluids than APC coatings.

2/2

USSR

VASIL'YEV, A. Ye., and LIVSHITS, A. B., Central Order of Lenin Institute of Hematology and Blood Transfusion

"Synthesis of N-aminoacyl Derivatives of Carboxymethyldextran"

Riga, Fiziologicheski Opticheski Aktivnyy Polimernyye Veshchestva, "Zinatne," 1971, pp 170-174

Abstract: The authors suggested new methods for the N-aminoacylation of carboxymethyldextran (CMD) and O-aminoacylation of dextran, which can be used for linking medicinal substances to polysaccharides and to their derivatives by strong bonds to hydrolysis. This is considered a new approach to the synthesis of drugs with prolonged action and with predetermined circulation time in human blood. The synthesis of N-aminoacyl derivatives of CMD was carried out as follows:

$$[C_6H_7O_2(OH)_3]_n \xrightarrow[NaOH]{m\,ClCH_2CO_2Na} [C_6H_7O_2(OH)_{3-m}(OCH_2CO_2Na)_m]_n \xrightarrow[KY-2]{H^+} [C_6H_7O_2(OH)_{3-m}(OCH_2CO_2H)_m]_n$$

USSR

VASIL'YEV, A. Ye., and LIVSHITS, A. B., Fiziologicheski i Opticheski Aktivnyye Polimernyye Veshchestva, "Zinatne," 1971, pp 170-174

For the condensation of CMD with C protected amino acids two methods were used. Best results were obtained with carbodiimide acylation of CMD in water-pyridine system at 20°C for 48 hr. When the pyridine:water ratio was 3:2, all carboxyl groups in CMD were substituted with aminoester groups; and when the ratio was 3:1, the substitution did not exceed 15%. This type of substitution took place in the case of methyl ester of glycyl-CMD. Methyl ester of L-histidyl-CMD with 11.4% carboxyl group substitution and benzene ester of glycyl-CMD with different carboxyl groups substitution were synthesized by the same method. As opposed to methyl ester of N-aminoacyl-CMD, the benzene ester of N-glycyl-CMD was insoluble in water when all carboxyl groups were substituted. In the case of lower substitution, the compound was soluble in water but could not be precipitated in alcohol. A detailed description of all reactions is presented.

2/2

USSR

VASIL'YEV, A. Ye., and KHACHATUR'YAN, A. A., Central Institute of Hematology and Blood Transfusion

"Synthesis of O-aminoacyl Derivatives of Dextran"

Riga, Fiziologicheski i Opticheski Aktivnyye Polimernyye Veshchestva, "Zinatne, 1971, pp 166-169

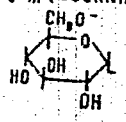
Abstract: A new method is suggested for the synthesis of such blood substitutes which could perform simultaneously several functions, such as hemodynamic + parenteral feeding, or hemodynamic + hemopoietic functions, etc. For this purpose several aminoacyl derivatives of dextran were synthesized which were considered as simplified analogs of glycoproteins with a reversed ratio of amino acid and carbon groups. The method is based on O-acylation of monosaccharides by condensation of N-acylamino acids with sugars in the reaction with dicyclohexylcarbodimida

USSR

VASIL'YEV, A. Ye., and KHACHATUR'YAN, A. A., Fiziologicheski i Opticheski Aktivnyy Polimernyye Veshchestva, "Zinatne," 1971, pp 166-169

$$[C_6H_7O_2(OH)_3]_n + m\,HO_2CRNHCOR' \longrightarrow$$

$$\xrightarrow{DMSO} [C_6H_7O_2(OH)_{3-m}(OCORNHCOR')_m]_n$$

$C_6H_7O_3(OH)_3 \equiv$ 

R = $-CH_2-$; $-(CH_2)_6-$; $>CHCH_2$ 

R' = OCH_2Ph ; Me

with the use of pyridine and dimethylsulfoxide mixture as solvent in which all reagents were soluble. The reaction was carried out at 40-60°C and the reaction products were separated on Sephadex G-50 and precipitated with alcohol from water. Absence of a significant destruction of the polysaccharide chains was verified by a comparative fractionation of the starting and modified polymer on Sephadex G-75. A modified polysaccharide with free amine groups was prepared by hydrogenation of O-acylaminoacyldextrans over Pd/C in the presence of two equivalents of oxalic acid.

2/2

1/2 018 UNCLASSIFIED PROCESSING DATE--30OCT70

TITLE--SOLUTION OF THE STEADY STATE PROBLEM OF THE HEAT CONDUCTION THEORY FOR WEDGE SHAPED BODIES WITH A BOUNDARY CONDITION OF THE THIRD KIND -U-

AUTHOR--VASILYEV, B.A.

COUNTRY OF INFO--USSR

SOURCE--DIFFERENTSIAL'NYE URAVNENIIA, VOL. 6, MAR. 1970, P. 531-537

DATE PUBLISHED----MAR70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--WEDGE BODY, CONDUCTIVE HEAT TRANSFER, DIFFERENTIAL EQUATION SOLUTION, EIGEN FUNCTION, INTEGRAL TRANSFORM

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1996/1474 STEP NO--UR/0376/70/006/000/0531/0537

CIRC ACCESSION NO--AP0118463

UNCLASSIFIED

2/2 018 UNCLASSIFIED PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0118463

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. DISCUSSION OF A PROCEDURE FOR SOLVING THE STEADY STATE PROBLEM OF HEAT CONDUCTION IN WEDGE SHAPED BODIES WITH BOUNDARY CONDITONS OF THE THIRD KIND. A THEOREM CONCERNING THE EXPANSION OF SOLUTIONS TO THIS PROBLEM INTO A SERIES OF EIGENFUNCTIONS OF THE STURN-LIOUVILLE PROBLEM IS DERIVED AND PROVED. THE PERTINENT STURN-LIOUVILLE PROBLEM IS REDUCED TO THE SOLUTION OF CERTAIN FUNCTIONAL INTEGRO DIFFERENTIAL EQUATIONS. THE MELLIN INTEGRAL TRANSFORM IS APPLIED IN THE PROCESS. FACILITY: LENINGRADSKII POLITEKHNICHESKII INSTITUT, LENINGRAD, USSR.

UNCLASSIFIED

USSR

UDC: 621.327.4.032.25

SULATSKOV, V. G., VASIL'YEV, B. D., KOKINOV, A. M.

"A Gas-Discharge Tube"

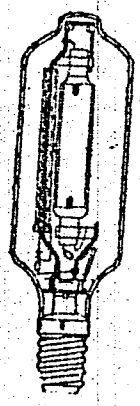
Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 7, Mar 72, Author's Certificate No 329598, Division G, filed 22 Jul 70, published 9 Feb 72, p 209

Translation: This Author's Certificate introduces a gas-discharge tube with alkali metal iodide additives. The tube contains an outer envelope, a gas-discharge burner and a current-conducting crossbar enclosed in a tube of insulating material such as quartz. As a distinguishing feature of the patent, migration of alkali metal ions through the burner envelope is reduced by applying a layer of metal such as aluminum to the outer surface of the tube. The metal layer is connected to an electric circuit consisting of a resistor and diode in parallel with the burner.

1/2

USSR

SULATSKOV, V. G. et al., USSR Author's Certificate No 329598



2/2

USSR

UDC 621.378.35

BOGDANKEVICH, O.V., ZVEREV, M.M., KOLOMIYSKIY, A.N., PROKHOROV, A.M., VASIL'YEV, B.I.

"Multielement Semiconductor Laser Of The 'Emitting Mirror' Type"

Kvantovaya elektronika, Moscow, No 5, May 71, pp 93-96

Abstract: The construction and some characteristics are described of a multielement laser of the emitting mirror type. A high-voltage pulse electron gun was used for pumping of the laser, with a beam energy of 103 kev and a current density of 20 a/cm^2. The polished plane-parallel disks 0.2-mm thick used as the working medium were cut out of single crystals of n-type conductivity gallium-arsenide doped with tellurium to a concentration of(1--2) . 10^{18} cm^{-3}. The generation power increases linearly with an increase of the cross section of the multielement target. A power of 28 kw is attained with a crystal with a 1 cm^2 area. The halfwidth of the directivity pattern is 7°, and the generation spectrum consists of several lines corresponding to the modes of the Fabry--Perot resonator. Received by editors, 28 Apr 71. 2 fig. 6 ref.

1/1

USSR

UDC: 620.17.171

KONONCHUK, N. I., AKIMOV, L. M., VASIL'YEV, B. N., LAPITSKIY, Yu. A., BELYAYEV, M. S., BICHUTSKAYA, O. V., KOPYLOV, A. A., TIKHOMIROVA, V. A., Moscow

"Study and Evaluation of the Kinetics of Fatigue Rupture of Heat-Resistant Alloys"

Kiev, Problemy Prochnosti, No 11, 1970, pp 19-23

Abstract: The results of an investigation of the fatigue resistance of heat-resistant alloys with symmetrical and asymmetrical loading cycles show significant and varied sensitivity to asymmetry in the loading cycle, depending on the type of alloy and test mode (temperature, number of loading cycles, etc.). This paper studies the kinetics of the development of fatigue cracks in heat-resistant alloy on the basis of the actual endurance characteristics with symmetrical and asymmetrical loading cycles. The process of specimen rupture was divided into two stages: the stationary stage before formation of the main crack and the nonstationary stage of development of the main crack to a certain depth, for example 10% of the

USSR

KONOCHUK, N. I., AKIMOV, L. M., VASIL'YEV, B. N., LAPITSKIY, Yu. A., BELYAYEV, M. S., BICHUTSKAYA, O. V., KOPYLOV, A. A., TIKHOMIROVA, V. A., Moscow, Kiev, Problemy Prochnosti, No 11, 1970, pp 19-23

specimen thickness. A formula is produced for the "viability factor" which, in combination with calculation of the values of Δt_i and t_{tr}, can describe the kinetics of development of fatigue cracks in various alloys. This factor expresses the sensitivity of the alloy to the development of the fatigue crack on the basis of the experimental characteristics of endurance of real alloys.

2/2

8

UDC 620.171.2

USSR

SKLYAROV, N. M., KONONCHUK, N. I., ZHUKOV, S. L., ZHUKOV, N. D., VASIL'EV, B. N., AKIMOV, L. M., LAPITSKIY, Yu. A., BELYAYEV, M. S., KRIVONOGOV, G. S., ISHCHENKO, I. I., POGREBNYAK, A. D., and KUFAYEV, V. N. (Moscow, Kiev)

"Estimating the Heat Resistance of Heat-Resistant Alloys Under Actual Operating Conditions"

Kiev, Problemy prochnosti, No 1, 1971, pp 13-21

Abstract: Problems concerned with estimating the endurance of heat-resistant materials under unstable loading conditions are analyzed. A method is suggested for producing and using "secondary" endurance characteristics, increasing the accuracy of estimation and calculation of guaranteed durability under operating conditions and forced equivalent loading modes. These secondary characteristics represent the dependence of the durability of materials on combinations of preceding programed and subsequent stationary loads in various proportions. The formula of linear addition of damage applies. The secondary characteristics are produced by accelerated testing over limited test periods with extrapolation to the area of increased durability.

1/1

USSR UDC: 519.24

VASIL'YEV, B. V.

"Methods of Modeling a Priori and a Posteriori Random Functions"

V sb. Zadachi statist. optimizatsii (Problems of Statistical Optimization --collection of works), Riga, "Zinatne", 1971, pp 153-162 (from RZh-Kibernetika, No 12, Dec 71, Abstract No 12V409)

Translation: The article deals with the theoretical aspects of the problem of modeling non-Gaussian unconditional and conditional random processes. It is shown that the solution of the problem may be found on the basis of triangular nonlinear conversion of a random vector to a random vector with components which are independent in the aggregate. Author's resumé.

1/1

USSR UDC 624.438.038.8

VASIL'YEV, D. P., IVANOV, Yu. M.

"Design of Two-Nozzle Centrifugal Gas Turbine Injectors"

Tr. Tsentr. N.-i. i Konstrukt. In-ta Toplivn. Apparatury Avtotrakt. i Statsioynar. Dvigateley [Works of Central Scientific Research and Design Institute for Fuel Apparatus for Motor Vehicle and Stationary Motors], No 52, 1972, pp 3-8, (Translated from Referativnyy Zhurnal, Turbostroyeniye, No 8, 1972, Abstract No 8.49.180).

Translation: A method is presented for design of two-nozzle injectors, based on experimental data. The dependences suggested allow calculation of the flow characteristics of the channels, maximum pressure before the injector and the relationship of pressures in the channels to produce satisfactory spray quality in the external nozzle connection mode for injectors spraying kerosene or fuels with similar properties. 5 Figures; 3 Biblio. Refs.

1/1

USSR

UDC 632.954

VASIL'YEV, D. S., Candidate of Agricultural Sciences

"Herbicides in Technical Cultures Planting"

Moscow, Zashchita Rasteniy, No 5, 1970, pp 27-28

Abstract: The article is a report on a sectional meeting at the Third All-Union Conference on herbicides. A. N. MEL'NICHUK (VNIS) discussed herbicides recommended for sugar beets in relation to the type of weeds and moisture levels. When applied to fields of sugar beets, mixtures of pyramine with tillam, eptam, or DCM (dichloromethane?) gave better results, as reported by A. N. MEL'NICHUK, G. M. TSU[illegible]MAN (Kazakh IZR), I. I. LIBERSHTEYN (Moldavian Scientific Research Institute of Selection, Seed Growing, and Agricultural Technology of Cultivated Fields), L. D. STONOV, and V. I. ZHARKOV (All-Union Scientific Research Institute for Chemical Means of Plant Protection, Moscow, State Committee for Chemistry USSR), I. V. SINYUGIN (Poltava Agricultural Experimental Station), and F. SH. YAPPAROV (Institute of Biology Bashkir Branch of the Academy of Sciences USSR). Use of a wide series of herbicides in cotton

1/3

USSR

VASIL'YEV, D. S., Zashchita Rasteniy, No 5, 1970, pp 27-28

planting was noted by many authors /"V. P. KONDRATYUK, M. A. LOZOVATSKAYA (All-Union Scientific Research Institute of Cotton Growing, Tashkent, Uzbek Academy of Agricultural Sciences), E. L. ALKHAS'YANTS, V. A. BOGACHENKO, A. I. KAMILOV (Central Asian IZR), A. A. RAKHIMOV, K. S. UVAROV, A. I. IMAMALIYEV (Institute of Experimental Biology for Plants, Academy of Sciences Uzbek SSR), and L. D. STONOV, I. T. ZABALUYEV (All-Union Scientific Research Institute for Chemical Means of Plant Protection) 7, covering such agents as monurone, diurone, catorone, prometrine, meturine, trephlon, herban, etc. N. G. ABRMOV (All-Union Scientific Research Institute of Flax, Torzhok, Ministry of Agriculture USSR), A. M. KOMAROV, YA. MONSTVILAYTE, V. MILALYUNENE, and V. B. BAGAYEV and A. A. ABUYEVA (Moscow Agricultural Academy imeni K. A. Timiryazev, Moscow, Ministry of Agriculture USSR) were concerned with weed control on flax fields, where 2M-4X is a popular agent, and A. V.

2/3

USSR

VASIL'YEV, D. S., Zashchita Rasteniy, No 5, 1970, pp 27-28

TARASOV (All-Union Scientific Research Institute of Bast Crops, Glukhov, All-Union Academy of Agricultural Sciences imeni V. I. Lenin) covered the area of hemp. Depending on the territory and climatic conditions, a battery of agents appeared to be available for treatment of the fields of sunflower, soya, and castor plants. D. S. VASIL'YEV, I. A. LUK'YANOV, and P. I. SHEVCHENKO (VNIIMK) covered coriander planting, while G. A. YESVANDZHIYA reported on basil and geranium, and V. I. MARTYNYUK (Voznesenskiy Experimental Station) on the rose fields. Finally, numerous papers were given on weed control in vegetable fields and orchards, with consideration of geographical, soil, and climatic conditions.

3/3

USSR

UDC 621.039.538:539.125.5

VASIL'YEV, G. A., VESELKIN, A. P., YEGOROV, Yu. A., ORLOV, Yu. V., PANKRAT'YEV, Yu. V., PISKUNOV, V. I.

"Space-Energy Distribution of Reactor Neutrons in Metal Hydrides"

V sb. Vopr. fiz. zashchity reaktorov (Problems in Reactor Safety Physics -- Collection of Works), No. 5, Moscow, Atomizdat, 1972, pp 91-105 (from RZh-50. Yadernyye reaktory, No 5, May 72, Abstract No 5.50.58)

Translation: Current designs of the shielding of nuclear reactors include hydrogen-containing materials, the presence of which in the shield makes it possible to shorten the size of the shielding and reduce the contribution to the power of the dose from neutrons of intermediate energies. Various hydrogen-containing materials are used in the shield: water, polyethylene, paraffin, concretes with an increased concentration of hydrogen such as Serpentinite concrete, etc. Metal hydrides may also be included in such materials. Metal hydrides have a high nuclear density of hydrogen, in some cases exceeding the nuclear density of hydrogen water. In studying the passage of neutrons through metal hydrides, one can show the perturbing

USSR

VASIL'YEV, G. A., et al, Vopr. fiz. zashchity reaktorov, No. 5, Moscow, Atomizdat, 1972, pp 91-105

effect of the metal nuclei on the form of the attenuation function or the form of the energy distribution of neutrons, and he can also show the role of the metal in the accumulation of moderating neutrons. The problem of the passage of neutrons through lithium, magnesium, titanium, and zirconium hydrides was investigated. The experiments were conducted on a water cooled - water moderated research reactor. 8 ill., 8 tables, 37 ref.

USSR UDC 577.1:615.7/9

KOLOSOVA, T. S., TIUNOV, L. A., KUSTOV, V. V., IVANOVA, L. V., VASIL'EV, G. A. LEMESH, G. A., and AKHMATOVA, M. A.

"Toxic Effect of Gaseous Products of the Organism's Vital Activity"

V sb. Probl. kosmich. biol. (Problems in Space Biology -- Collection of Works), Vol 16, Moscow, "Nauka," (Science), 1971, pp 182-190 (Russian) (from RZh-Biologicheskaya Khimiya, No 20, 25 Oct 71, Abstract No 20F1687 from summary)

Translation: Rats were kept for 26 days in metal airtight chambers with automatic O_2 supply and CO_2 excess removal. It was established that the complex of gaseous substances given off by the organism causes lung tissue damage and anemia, increases oxygen consumption and the weight of the thyroid gland, and alters blood catalase activity.

1/1

USSR

UDC 615.916:264-31.06:617.001.28-092.9

KUSTOV, V. V., TIUNOV, L. A., VASIL'YEV, G. A., KEYZER, S. A., and IVANOVA, F. A., Moscow

"Combined Effects of Carbon Monoxide and Ionizing Radiation in a Chronic Experiment"

Moscow, Gigiyena Truda i Professional'nyye Zabolevaniya, No 5, 1971, pp 36-38

Abstract: Exposure of rats to carbon monoxide (0.012 mg/L) for 85 days inhibited the animals' growth, increased their resistance to hypoxia, and decreased the weight of the lungs and liver. Exposure of other rats to the same amount of CO and ionizing radiation (0.05 rem/day) for the same length of time had no effect on the animals' growth or resistance to hypoxia, but it decreased the weight not only of the lungs and liver but of the testes as well. In a second experiment, exposure of rats to ionizing radiation but at a lower dose of CO (0.005 mg/L) did not have any specific adverse effects, for in hematologic, biochemical, and morphologic respects the experimental animals virtually indistinguishable from the controls.

2/7

USSR

UDC 621.396.61.029.64

VASIL'YEV, G. F., YEVDOKIMENKO, YU. A., GINZBURG, V. N.

"Calculation and Design of Decimeter-Range Diode Commutation Devices"

Tr. Mosk. aviats. in-ta (Works of Moscow Aviation Institute), 197, vyp. 215, pp 265-284 (from RZh-Radiotekhnika, No 4, Apr 71, Abstract No 4D327)

Translation: Some circuits of decimeter range commutation devices are analyzed in which resonance diode breakers with distributed inductance are used. It is demonstrated that connecting the distributed reactive elements (inductive loop) to the p-n diode circuit permits realization of the optimal parameters of the diode breaker on low frequencies far from the natural resonance frequency of the commutation diode, and the parameters of the auxiliary inductance can be selected to optimize the switches and phase converters constructed on the basis of these breakers. A procedure is presented for engineering calculation of the diode breakers and more complex commutation devices. Descriptions of models of the decimeter wave range switches and phase converters and their experimental characteristics are presented. The bibliography has 6 entries.

1/1

USSR

UDC 621.396.61.029.64

BUKHONINA, G. A., VASIL'YEV, G. F., GALKOVSKIY, V. A., GOL'BERG, I. YE. GINZBURG, V. N.

"Study of Some Characteristics of Decimeter-Range Diode Commutation Devices"

Tr. Mosk. aviats. in-ta (Works of Moscow Aviation Institute), 1970, vyp. 215, pp 284-310 (from RZh-Radiotekhnika, No 4, Apr 71, Abstract No 4D328)

Translation: A study is made of the effect of the high-frequency circuits of decimeter-range diode breakers on their speed, bandwidth, noise and behavior at microwave levels close to limiting for control p-n diodes. It is demonstrated that the speed of all the commutation devices with p-n diodes in the decimeter range is on the order of units of nanoseconds with the exception of the maximum decoupling setup time in the blocked arm of the switch which is on the order of hundreds of nanoseconds. One method of expanding the operating band of the switches is presented. The bibliography has 8 entries.

1/1

USSR

ATANOV, P. K., KATMAN, A. K., VASIL'YEV, G. F., SAPRONOV, V. I., SILANT'YEV, P. P.

"Single-Pole Transistor Flip-Flop"

USSR Authors' Certificate No 250997, Filed 14 May 1968, Published 3 January 1970 (Translated from Referativnyy Zhurnal Avtomatika, Telemekhanika i Vychislitel'naya Tekhnika, No 10, 1970, Abstract No 10B110P, by N. V.)

Translation: The flip-flop suggested differs in that the load resistors are connected in series with the source-drain junctions of blocking single-pole transistors, the gates of which are combined and connected to the control input. The substrate of the blocking transistors is isolated from the substrate of the remaining flip-flop circuit. This allows the speed of the flip-flop to be increased while decreasing the dissipated power. One illustration.

1/1

USSR

UDC 621.396.6-181.5

VASIL'YEV, G. P., RADKOVSKIY, S. G.

"Methods of Mounting Hybrid Integrated Circuits. A Survey of Data of the Non-Soviet Press"

Elektron. prom-st'. Nauchno-tekhn. sb. (The Electronics Industry. Scientific and Technical Collection), 1970, No 1, pp 93-98 (from RZh-Radiotekhnika, No 10, Oct 70, Abstract No 10V149)

Translation: The authors note the advantages of mounting with the use of stiff leads as compared with the use of flexible leads. Various methods of producing stiff leads are described. Comparative data are given on the various metals which are used. The technology of separating plates into sections with and without etching (with the use of preliminaty scribing) is considered. A technique is described for connecting semiconductor crystals with stiff leads to a plate and to a housing. Two illustrations, one table, bibliography of 15 titles. N. S.

1/1

VASIL'YEV, G. K.

Communications

JPRS 54359

29 October 1971

UDC: 621.395.4:621.315.212

NEW MULTICHANNEL COAXIAL CABLE EQUIPMENT

[Article by G.G. Borodzuk, et al.*: "Improved Multichannel Communications Apparatus for K-1920U Coaxial Cable"; Moscow, Elektrosvyaz', Russian, No 8, August 1971, pp 24-34]

General Information

The K-1920 apparatus developed from 1955-1960 inclusive has been used widely in communications networks in the Soviet Union. It makes it possible to organize up to 1,920 channels of tonal frequency (tch) or 300 channels of tch for simultaneous two-directional television transmission over two pairs of coaxial KMB-4x2.6/9.4-mm cable. Such channels were used for telephone communications, telegraph and facsimile, for the transmission of data, broadcasting, newsprint facsimile, etc.

Experience in the operation of this system on long main lines has brought out shortcomings of some apparatus and the need for their improvement in order to raise the stability of the characteristics and reliability of communications channels. This is especially important for lines longer than 2,000 to 3,000 kilometers with long sections between attended repeater stations.

Under the conditions prevailing in our country with its huge territory (...) with a constantly increasing volume of data being transmitted, it has become necessary to organize large bands of communications channels for distances of up to 10,000 to 12,000 km. It was necessary to build powerful main lines using combination cables to satisfy channel requirements. These cables contain a greater number of coaxial pairs (6 or 8 instead of 4 as in the KVB-4 cable), 4 or 6 coaxial pairs of smaller 1.2/4.4 mm diameter multiplexed by the K-3002 distribution system, and 0.9 mm diameter balanced pairs for service communications, K-24 distribution system and telemechanics.

* A. S. Blokhin, A. Ye. Monushkin, A.G. Markulov, G.N. Stepanov, N. Ye. Lugovskoy, G. K. Vasil'yev

USSR

UDC 621.319.4

VASIL'YEV, G. F., MESHKOV, V. A., SAPRONOVA, L. S.

"Effect of Tantalum Film Defects on the Quality of a Thin-Film Tantalum Capacitor"

Elektron. tekhnika. Nauch.-tekhn. sb. Mikroelektronika (Electronic Engineering. Scientific and Technical Collection. Microelectronics), 1971, vyp. 5(31), pp 142-144 (from RZh-Radiotekhnika, No 5, May 72, Abstract No 5V418)

Translation: The results are presented from a study performed on capacitors with Ta_2O_5 dielectric which was obtained by anodizing and heat treating a β-tantalum film. The data obtained for primed (with a layer of thermally oxidized Ta) and unprimed substrates are compared. There are 3 illustrations and a 2-entry bibliography.

1/1

USSR UDC: 541.124.7

TAL'ROZE, V.L., VASIL'YEV, G.K., and BATOVSKIY, O.M., Institute of Chemical Physics, Moscow, Academy of Sciences USSR

"Chemical Lasers Whose Operation Is Based on Chain and Branched Chain Reactions"

Moscow, Kinetika i Kataliz, Vol 11, No 2, Mar-Apr 70, pp 277-289

Abstract: Work on chemical lasers by the authors and others is reviewed. In work carried on by the authors and other members of their group, the theoretical aspects of a laser operating on the basis of the reaction $H_2 + F_2$ were subjected to study and experimental data obtained on the characteristics of a laser of this type. The reaction $H_2 + F_2$, being a branched chain reaction, could be expected to convert chemical energy into energy of stimulated emission more effectively than reactions of other types. The efficiency of conversion of chemical energy in an $H_2 + F_2$ laser proved to be 0.2-2%. Contribution of chain branching to generation became significant after the second limit of ignition had been reached i.e., a point had been passed beyond which energy branching began, but generation at a lower level of conversion of chemical energy was already observed in the region of a straight-chain reaction after passage of the first ignition limit. Violent $H_2 + F_2$ combustion in a laser of this type can be eliminated by regulating the composition of the gas mixture - specifically, by adding O_2, which acts as an

1/2

TAL'ROZE, V.L., et al, Kinetika i Kataliz, Vol 11, No 2, Mar-Apr 70, pp 277-289

inhibitor. From the standpoint of application in the production of a laser effect, a reaction with continuous branching ought to be of advantage in comparison with a reaction such as $H_2 + F_2$ that branches only rarely. The only reaction with continuous branching which has been studied in detail is that of H_2 with O_2, but the elementary act of branching in this reaction requires a high activation energy.

USSR

VASIL'YEV, G. S., YEFIMENKO, G. G., KOVALEV, D. A., SULIMENKO, YE. I., and GAMAZOVA, L. B., Dnepropetrovsk Metallurgical Institute

"Effect of Magnesium on the Process of Sintering Briquettes Made of an Iron-ore Agglomerate Charge in an Oxidizing Atmosphere"

Novokuznetsk, IVUZ-Chernaya Metallurgiya, No 6, 1971, pp 23-30

Abstract: A study was made of the effect of magnesium additives on the process of sintering and on the quality and phase composition of a briquetted agglomeration charge for its solid-phase sintering without fuel in an oxidizing atmosphere.

The introduction of MgO into a charge prevents oxidation of magnetite to hematite due to its introduction into the magnetite lattice and the substitution of FeO for MgO with the formation of solid solutions of MgO in Fe_3O_4. Dissolving of magnetite in magnesium ferrite increases the system's melting point.

Strengthening of samples is manifested by producing a denser structure due to the lack of a change in volume as a result of oxidation of magnetite to hematite as well as the formation of minerals, containing MgO, which possess a coefficient of thermal expansion close to the coefficient of its related minerals. Two figures, 5 tables, 5 bibliographical references.

1/1

Acc. Nr: AP0100229 Abstracting Service: CHEMICAL ABST. Ref. Code: 4R0062

110699d Isomerization of 1-tert-butylthio-3-butyne under the influence of alkali in an alcohol medium. Prilez'aeva, E. N.; Vasil'ev, G. S.; Petrov, V. N. (Inst. Org. Khim. im. Zelinskogo, Moscow, USSR). *Izv. Akad. Nauk SSSR, Ser. Khim.* 1970, (1), 188–90 (Russ). Reaction of 1-bromo-3-butyne with Me_3CSNa in EtOH 3.5 hr, finally at 40°, gave 67% $Me_3CSCH_2CH_2C{:}CH$, b_{12} 72–3°, $n^{20}D$ 1.4690, d^{20} 0.8875. This heated at 130° in a sealed tube in alc. NaOH in the presence of 2-$C_{10}H_7NHPh$ as inhibitor gave 75% (in 8 hr) equil. mixt. of isomers (reported earlier) contg. 50% $Me_2CSCH{:}CHCH{:}CH_2$ and 40% $Me_2CSC{:}CCH_2Me$, along with a small amt. allenic isomer. The changes were followed by ir spectra.

G. M. Kosolapoff

REEL/FRAME
19841619

ELECTRONICS

USSR

UDC: 550.388.2

BORISOGLEBSKIY, V. S., VASIL'YEV, G. V., KOZLOV, B. F., PROKHORENKO, E. A., PROKHORENKO, V. P., Special Design Office of Physical Instrument Making of the Institute of Terrestrial Magnetism of the Ionosphere and Propagation of Radio Waves of the Academy of Sciences of the USSR

"An Ionospheric Probe"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 9, Mar 72, Author's Certificate No 331354, Division G, filed 25 Nov 70, published 7 Mar 72, p 143

Translation: This Author's Certificate introduces an ionospheric probe which contains an antenna with switch, a transmitter, a superhet receiver, a frequency synthesizer, a quartz-crystal oscillator module, a high--frequency amplifier module with electronic commutator, and a registration unit. As a distinguishing feature of the patent, the probe is designed for improved accuracy of measurements, acceleration of the process of recording a nomogram, and simultaneous printing of auxiliary symbols for operational analysis of the nomograms. A multiple-electrode registration unit is used with a paper-chart recording and with recording shapers on each electrode.
1/2

USSR

BORISOGLEBSKIY, V. S. et al., USSR Author's Certificate No 331354

The registration unit is connected to the superhet receiver through a coding module. Connected to one input of the coding module is a matching unit which is connected to the quartz-crystal oscillator module through an electronic commutator. Connected to the other input of the coding module are the outputs of mosaic storage and electronic calendar modules which are connected directly to some of the recording shapers.

50: JPRS 60513
19 Nov 73

Radar/Lidar
Meteorology

PROBLEMS OF TECHNICAL REALIZATION OF RADAR MEASUREMENTS OF HAIL

[Article by G. V. Vasil'yev, M. T. Abshayev, Leningrad, Vysokogornyy Geofizicheskiy Institut (Trudy, No. 21, Prikladnaya Meteorologiya, Russian, 1972, pp 168-175)]

VASIL'YEV, G. V.

Introduction

The broad development of radiotechnical devices for meteorological observations permits at this time successful solution of the problem of detecting a hail center in the clouds and measuring its parameters. These data are necessary for the organization of cloud modification to prevent hailstorms.

The work done in the last ten years with respect to radar examination of hail clouds has advanced an entire series of methods of hail detection and measurement. The method developed at the High Altitude Geophysics Institute and based on measuring the ratio of the radar reflectivity of a unit volume of the cloud for two wavelengths is of greatest interest.

Theoretical Principles of Measuring Hail Dimensions

According to the method of the High Altitude Geophysics Institute [1], the radar reflectivity η, cm^{-1} of the same unit reflecting volume of a hail center must be determined simultaneously for two wavelengths λ_1 = 3.2 cm and λ_2 = 10 cm. In this case, in the small particle range (clouds and raindrops, graupel and hail less than 0.6-0.7 cm) for both wavelengths the conditions of Rayleigh scattering are satisfied, and the reflectivity ratio is equal to $\eta_2/\eta_1 = 100$ independently of the intensity of the precipitation and the moisture content of the cloud. In the case of the presence of large hailstones the scattering law for λ_2 differs significantly from the Rayleigh law, and on λ_1 these differences are exhibited to a lesser degree. Thus, as demonstrated in [1, 2], and no only, the ratio of the radar reflectivity for the two wavelengths is a function of the diameter of the scattering particles which is used as the basis for the hail indication method. The hail indication problem in this case includes the solution of the following problems: